DOMESTIC ENGINEERING

Whole Number 132 *Chicago and New York, October Fifteenth, Nineteen Hundred* *Vol. 20 No. 1*

NEW YORK, BOSTON, MINNEAPOLIS, DENVER, PHILADELPHIA, ST. LOUIS, LONDON, HAMBURG

AMERICAN RADIATOR CO. GENERAL OFFICES LAKE & DEARBORN STS. CHICAGO.

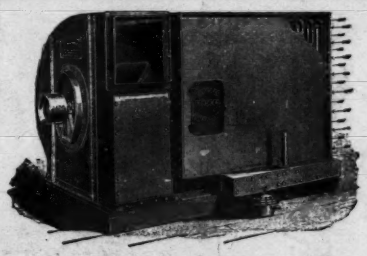
INDIRECT—DIRECT RADIATORS
DIRECT INDIRECT

PENN RADIATOR COMPANY, CORRY, PA.

U.S. RADIATOR CO.

Home Office DUNKIRK, N. Y. And Foundry

TRITON .·. .·. CHAUTAUQUA



Buffalo FAN SYSTEM OF HEATING & VENTILATING ALL LARGE BUILDINGS. BUFFALO FORGE CO. BUFFALO, N.Y.

See our Advertisement...Page 49

WHAT A DIFFERENCE

In the quality of Plumbing work.

RAYMOND'S

COMBINATION FERRULES MAKE RELIABLE CONNECTIONS BETWEEN LEAD AND IRON PIPES.

WHY ?

Because they have an extra thickness of lead over the shoulder, giving strength where it is needed, and where other Lead Ferrules are weak.

The genuine article bears our label.

RAYMOND LEAD COMPANY, CHICAGO.

F. E. Cudell's PATENT sewer gas and back-water **trap**

for wash bowls, sinks, bath and wash tubs

Put into the White House by the U. S. government. For venting use vent trap.

CLEVELAND, OHIO

UNIONTOWN ACME RADIATOR CO.

UNIONTOWN, PA.

MANUFACTURERS OF

STEAM AND HOT WATER RADIATORS

PATTERNS

GOBEILLE PATTERN CO. Cleveland, O.

JENKINS BROS.' VALVES

are manufactured of the best steam metal, and are fully guaranteed. Why experiment with cheap valves? If you want the **BEST** ask your dealer for valves manufactured by Jenkins Brothers. Remember all genuine are stamped with our Trade Mark.

JENKINS BROTHERS. New York, Phila., Chicago, Boston.

MANTLE CHEMICALS

The Roessler & Hasslacher Chemical Co.

Office: 100 William St., New York
Chicago Office: 16 N. Clark St.

REFLECTION

frequently makes things appear in a different light. If my reflectors are used things appear in the best light.

I. P. FRINK, 551 Pearl St., N. Y. City

OAKUM PACKING AND ROPE

Planet Mills Mfg. Co.

335 Carroll St. BROOKLYN, N. Y.

The Pattern Shop of the East

H. B. OLMSTEAD & CO.

87 FRANKLIN ST. NEW YORK

SEE OUR HEATER PAGE 6 **ADV.**

ISAAC A. SHEPPARD & CO., - PHILADELPHIA

VULCAN CHAIN PIPE WRENCH — Quality — VULCAN CHAIN PIPE WRENCH

Secure 1900 Catalogue "L"

J. H. Williams & Co.

BROOKLYN, N. Y.

Wrench Makers to the People

VULCAN CHAIN PIPE WRENCH — Quality — VULCAN CHAIN PIPE WRENCH

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DIRECT INDIRECT

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DOMESTIC ENGINEERING

IMPRIMATUR
Aug 30 1902

The Grand Prix

Highest Possible Award—higher than gold, silver or bronze medals or honorable mention — **and the ONLY Grand Prix given**

at the Exposition Universelle, Paris, 1900, on Radiators and House Heating Boilers to **to any Heating Apparatus Manufacturer in the World** was awarded

American Radiators and Ideal Boilers

Made by

Chicago
Philadelphia
New York
St. Louis

AMERICAN RADIATOR COMPANY

Boston
Minneapolis
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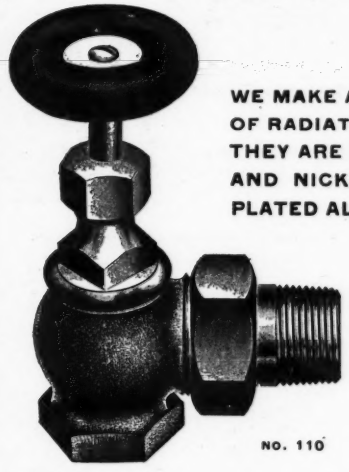
CRANE RADIATOR VALVES
FOR STEAM AND HOT WATER



NO. 110

WE MAKE AND CARRY IN STOCK A VERY LARGE LINE OF RADIATOR VALVES OF ALL DESCRIPTIONS.
THEY ARE MADE WITH ROUGH BODY, ROUGH BODY AND NICKEL-PLATED TRIMMINGS, AND NICKEL-PLATED ALL OVER.
ARE FURNISHED WITH EITHER BRASS OR COMPOSITION DISCS.
OUR QUICK-OPENING PATTERNS ARE ESPECIALLY SUITABLE FOR HIGH-CLASS WORK.

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NO. 141

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CRANE CO.
CHICAGO
ESTABLISHED 1855

ST. PAUL
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LOS ANGELES
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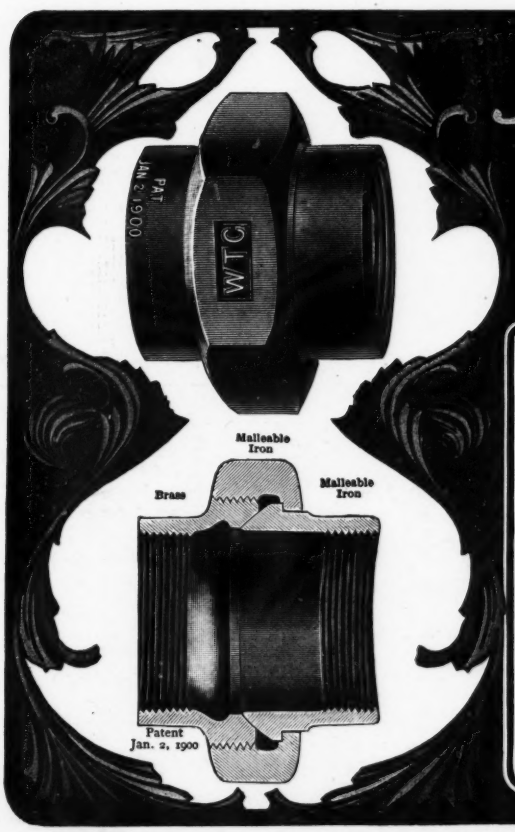


A UNION WITH NO GASKET Will not Rust.

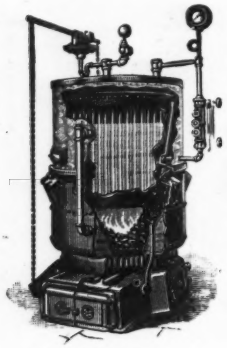
"The Kewanee"
It is removable

the joint being easily disconnected because of the different metals (brass and iron) employed. Write for circular.

MANUFACTURED BY

Western Tube Co.
Kewanee, Ill.

104916



Hard Coal Boiler.

The Gorton Side Feed Boilers

You want the best, We have it.

FOR STEAM AND HOT WATER HEATING.

Send for Catalogue and Investigate for Yourself.

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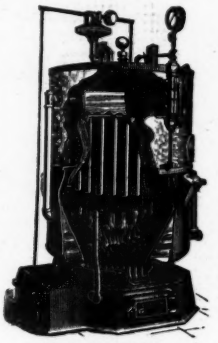
77 Oliver Street, Boston, Mass. Prudential Bldg. Atlanta, Ga.

GORTON & LIDGERWOOD CO.



Soft Coal Boiler.

GEM Hot Water and Steam BOILERS

EASILY AND QUICKLY SET UP
CAPACITY GUARANTEED

WE ALSO MAKE THE

ABENDROTH VERTICAL SECTIONAL STEAM AND WATER BOILERS

LONG AND FAVORABLY KNOWN TO THE TRADE EVERYWHERE

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AGENTS: Crane Co., Philadelphia, Pa. Western Valve Co., Chicago, Ill.

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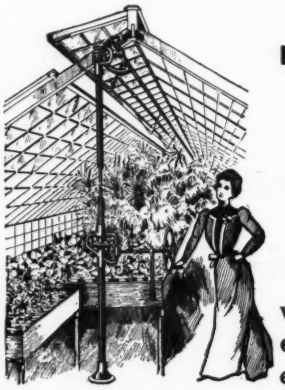
For Factories, Stables, Greenhouses, etc.

LOW COST SATISFACTION GUARANTEED



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HEATING AND VENTILATING APPARATUS

FOR ALL KINDS OF BUILDINGS.

We furnish material with full directions for erection, or estimate on erection also.

Greenhouse Construction Catalogue, also Greenhouse Heating and Ventilating Catalogue, mailed from our New York office on receipt of five cent postage for each.

LORD & BURNHAM CO.

NEW YORK OFFICE
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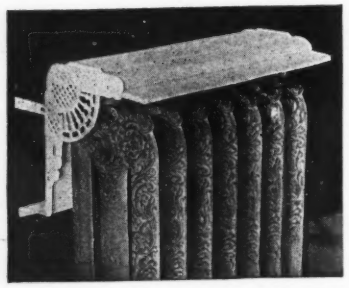
Broadway and 26th St.

GEN'L OFFICE and WORKS,
Irvington-on-the-Hudson, N. Y

A "Perfect" Radiator Shield



The "Perfect" Shield makes its appearance this season in a new dress. It has been re-designed to meet the demand for a high grade article which would be in harmony with other finishings in a fine modern dwelling. It is nice enough for the finest room and cheap enough to be an item of Economy in any class of buildings. It will protect your walls and ceilings and improve the radiation. It will fit any radiator and is provided with firm fastenings. It is made of crimped Galvanized Steel with double top. For further information and prices address

Decatur Cornice & Roofing Works 620 N. Main Street Decatur, Ill

WILKS'

Hot Water Heaters and Steam Generators

N. S. BOUTON, President
E. H. SEDGWICK, Treas. and Gen'l Mgr

BEST IN USE
ALL STEEL
NO COILS "FLUES"

NO CAST IRON SECTIONS.

Send for Catalogue.

S. Wilks Mfg. Co.
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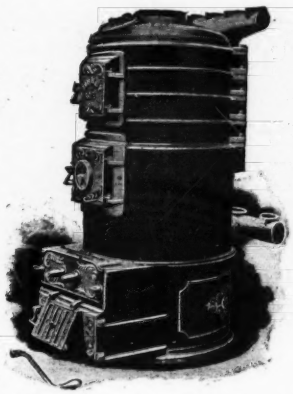
New York Office, JUDSON A. GOODRICH CO., 105 Beekman St.



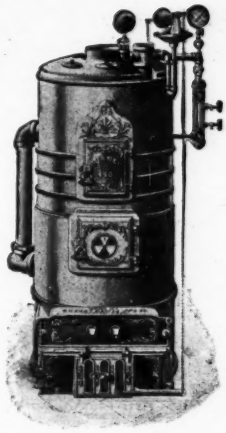
Gurney 400 Series Hot Water Heater.

Gurney

HOT WATER HEATERS
Steam Boilers
AND
RADIATORS

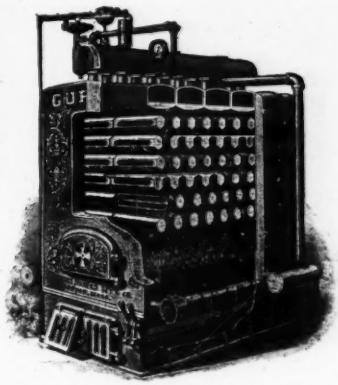
Represent **Progression** and **Advancement** in the Manufacture of Successful **Heating Apparatus.**

SOLD ONLY THROUGH THE TRADE.



Gurney 400 Series Steam Boiler.

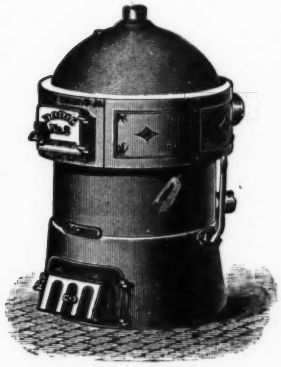
THE STANDARD OF THE WORLD for their Respective Requirements.



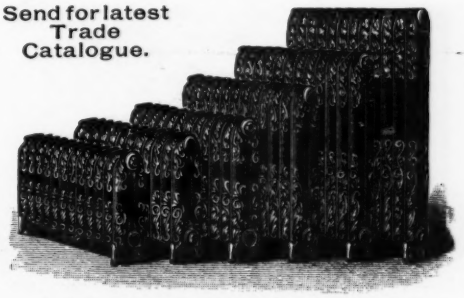
"Bright Idea" Steam Boiler, Sectional View.

For Durability, Efficiency and Economy, They Continue To Be Unsurpassed.

Send for latest Trade Catalogue.



Doric Hot Water Heater.



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GURNEY HEATER MFG., CO.
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New York Branch: 111 Fifth Ave., cor. 18th St., N. Y.
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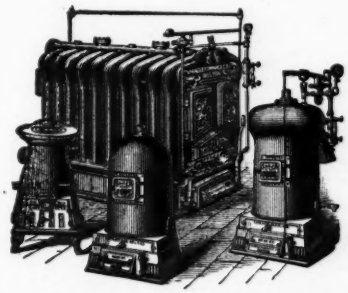
For tapping water and gas mains against pressure. It leads them all. Sold on approval. Taps mains from 3 to 30 inches. No saddles required for different sized mains. Weight, complete, only 18 lbs. A boy 12 years old can make a connection in 15 minutes. Get prices from

J. M. HADESTY & SON
TAMAQUA, PA.



MAGEE STEAM AND HOT WATER HEATERS

THE MOST COMPLETE LINE UNDER ONE NAME MADE IN THE UNITED STATES

OUR CAPACITIES RANGE IN
Square feet of Water Radiation 100 to 6,000
Square feet of Steam Radiation 200 to 3,600

Send for catalogue Correspondence solicited

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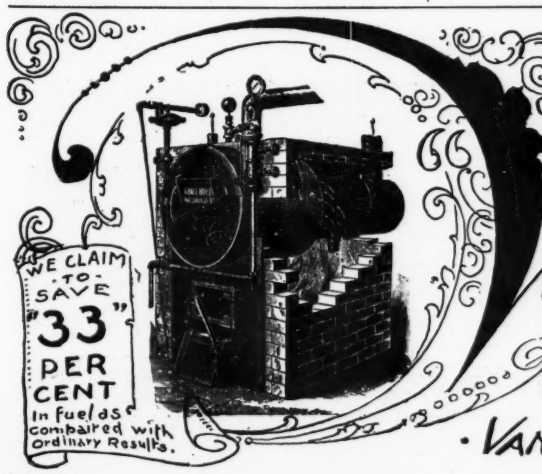
WE CLAIM TO SAVE "33" PER CENT In fuel as compaired with ordinary Results.
FOR Hard and SOFT COAL. Durable and Economical Send for Catalogue

Vance Boilers

FOR STEAM and HOT WATER HEATING

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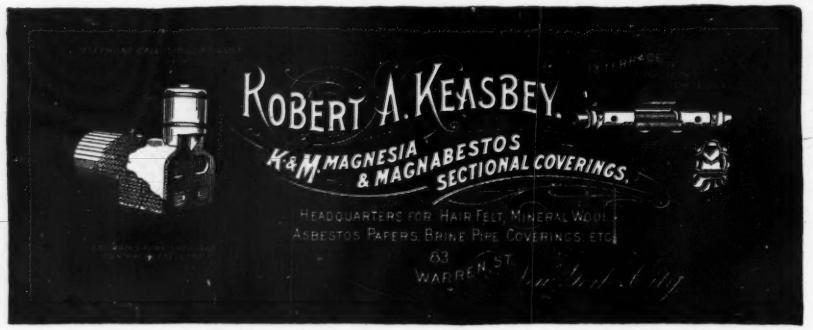
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K&M MAGNESIA & MAGNABESTOS SECTIONAL COVERINGS.
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Steam Heating Problems

Or Questions, Answers and Descriptions relating to Steam Heating and Steam Fitting.

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Price, $3.00. Postage Paid.

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The Bard Adjustable Bushing FOR HAND DIE STOCKS

The bushing is made to fit any die stock in place of the common ring bushing. Adjustable to all sizes of pipe and bolts. The adjustable bushing always guides the pipe perfectly to the center and insures a straight thread.

May always be left in stock.

Put a **Bard Adjustable Bushing** on every stock you use, and save time and money.

Manufactured by **The Armstrong Mnfg. Co.** Bridgeport, Conn.

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AMERICAN STEAM GAUGE COMPANY

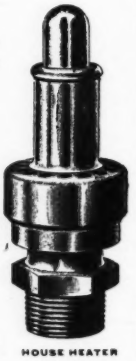
MANUFACTURERS OF

GAUGES THAT GAUGE

INDICATORS THAT INDICATE

POPS THAT POP

Steam and Altitude Gauges, Pop, Safety and Water Relief Valves, Whistles, Thermometers, Etc.



HOUSE HEATER POP VALVE

CHICAGO BOSTON NEW YORK

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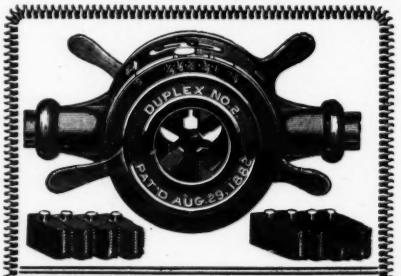

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DUPLEX ADJUSTABLE STOCKS and DIES should be in the hands of every PLUMBER AND PIPE FITTER. DO YOU OWN ONE? Let us mail you list and quote prices : : : : :

THE HART MFG. CO.

No. 19 Wood Street Cleveland, Ohio

ON THE FENCE

is no place for you to be in a matter which vitally concerns your business interests. It is important that you should know which is the best furnace and which is the best range for you to sell to your best customers. That means that you should know all about the good points of the Paragon Furnace and the Excelsior Range. If you don't know, let us help you.

We now make Steam Generators and Hot Water Circulators. They, too, are "Paragon."

ISAAC A. SHEPPARD & CO.,

NEW YORK, PHILADELPHIA, BALTIMORE.

Place Orders Now for

The Royal Shield

The best on the market for the following reasons:

- Stronger in construction
- Neater in appearance
- More easily attached and detached
- Takes up less space
- Lower in price than any other made
- Can be attached to any radiator

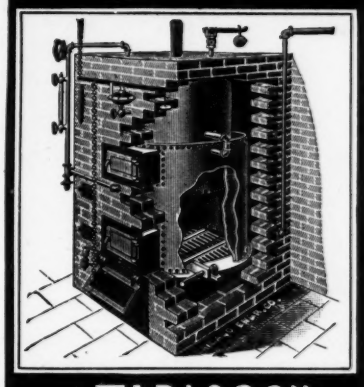
We guarantee these shields to be on a par with the high standard we have always maintained.

Write for Circular and Price List.

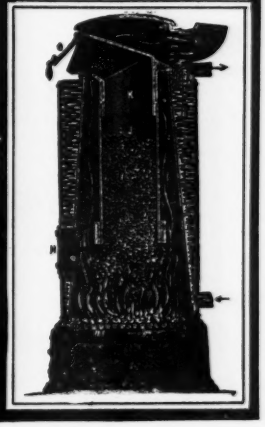
Twin Burner Vapor Stove Company

206-210 S. 17th Street, ST. LOUIS. MO.

KEWANEE BOILER COMPANY
KEWANEE ILL.



MANUFACTURERS OF HAXTUN STEEL BOILERS FOR HOT WATER AND STEAM HEATING



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ALL STEEL
SELF FEEDERS

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TOOLS AND SUPPLIES

FOR STEAM, WATER AND GAS USERS

ESTABLISHED 1842

INCORPORATED 1872

128 TO 136 FEDERAL STREET
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NEW YORK OFFICE, PARK ROW BLDG.
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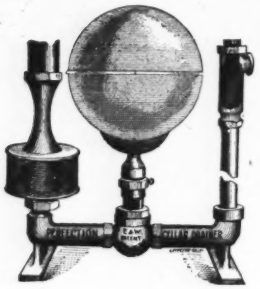
When in the market for



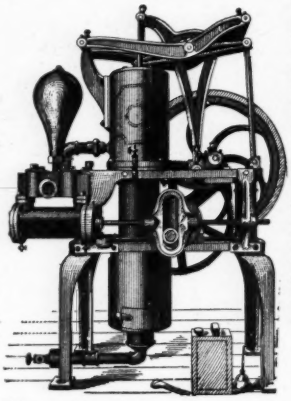
Hot Air Pumping Engines

Hydraulic Pumps

or

Cellar Drainers

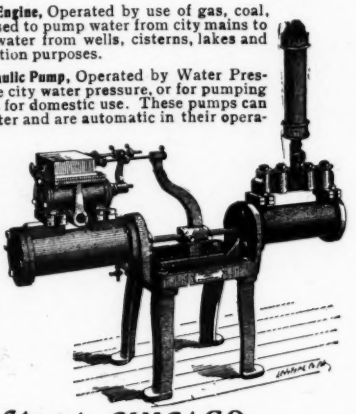
to let us tell you about our devices and quote prices



Erwin-Welch Hot Air Pumping Engine, Operated by use of gas, coal, gasoline or kerosene oil. Used to pump water from city mains to roof tanks or for pumping water from wells, cisterns, lakes and rivers for domestic or irrigation purposes.

Erwin-Welch Automatic Hydraulic Pump, Operated by Water Pressure Only. Used to increase city water pressure, or for pumping water from wells or cisterns for domestic use. These pumps can be used without wasting water and are automatic in their operation. Built in 25 sizes.

Our Perfection Cellar Drainer Is operated by water or steam pressure. Used to force out water that may accumulate in Cellars, Wheel Pits, Foundation, Ditch and Pit Excavations, etc. The Drainer stops and starts automatically. Is the strongest, most durable and most efficient made.



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A Paul System Heating Plant

Costs less to operate than any other type of heating plant. No disagreeable odors from air valves. Every square inch of heating surface rendered effective. Steam held in radiator until condensed. Water returned to boiler at high temperatures.

The Paul System can be introduced upon any type of existing plant or installed in connection with any new plant. You make money, and your client saves money by introducing the **Paul System.**

PAUL SYSTEM COMPANY

Boston: 38 Pearl St.
Chicago: 1212 Fisher Bldg.
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BROOMELL'S VAPOR SYSTEM or STEAM HEATING.

Adapted to buildings of any kind or size. Has all advantages of hot water heating without any objectionable features. Absolutely noiseless. No pressure. No air valves. No pumps or machinery. Superior to any other system of heating and costs less. Installed by all steamfitters. : : : : : : SEND FOR CATALOGUE.

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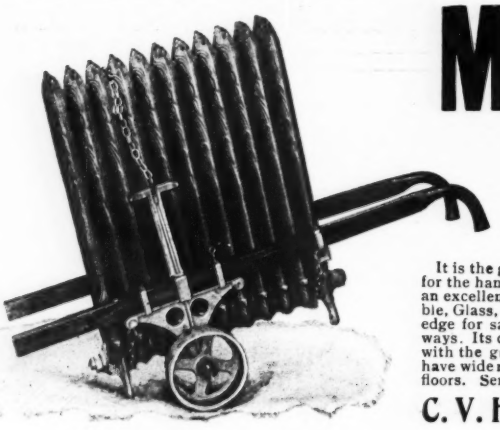

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Indispensable Radiator Truck

Simple and Easy to Handle

It is the greatest labor-saving device ever invented for the handling of Radiators. It can also be used to an excellent advantage for moving Slate, Stone, Marble, Glass, etc., or anything that has to be carried on edge for safety, or to get through narrow passage ways. Its construction is simple and it can be handled with the greatest ease. The wheels are extra large, have wide rubber tires, which will not scratch polished floors. Send for price.

C. V. Hill & Co., Trenton, N. J.

There are Some Things

perfectly clear to us that we cannot make other people see as clearly as we do. The wide-spread adoption of **THE WEBSTER FEED WATER HEATER AND PURIFIER** is the result of its own powers to show what it can save in furnishing fit food for boilers. People buy it simply because it is a money saver. Shall we mail you our catalogue?

WARREN WEBSTER & CO.
CAMDEN, N. J.

PHILADELPHIA, 1105 Stephen Girard Bldg.
NEW YORK, 322 Broadway.
CHICAGO, 1509 Monadnock Bldg.
BOSTON, 729 Tremont Bldg.

The Two Great Wrenches

The "TRIUMPH" and The "ALLIGATOR"

Never loses its grip or its handle.
Never crushes or locks on the pipe.
Can be used as a monkey-wrench or pipe-wrench.

The Original. Always ready.
The Reliable. Always positive.
The Genuine. Never slips.

Write for circulars and prices and mention DOMESTIC ENGINEERING

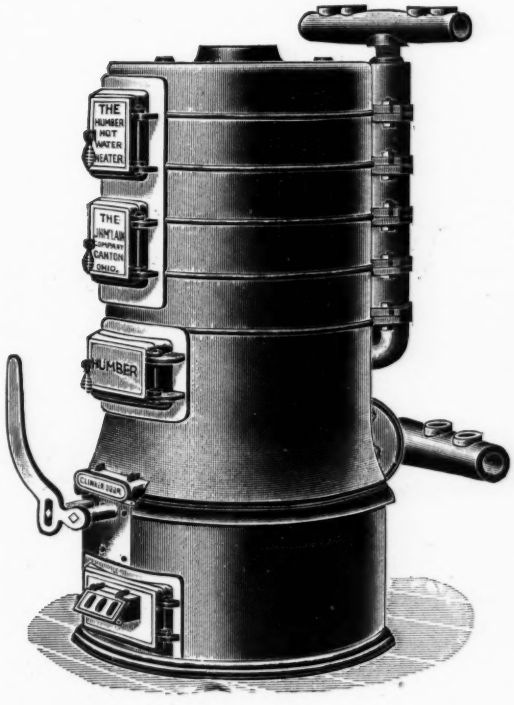
American Saw Co.

TRENTON, N. J.

The J. H. McLain Company

MANUFACTURERS OF

Hot Water and Steam Boilers



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Radiators Valves Pipe and Fittings

AND ALL MATERIAL USED IN THE CONSTRUCTION OF HOT WATER OR STEAM PLANTS

SEND FOR CATALOGUE

The J. H. McLain Co.

CANTON, OHIO

Steam Fitters

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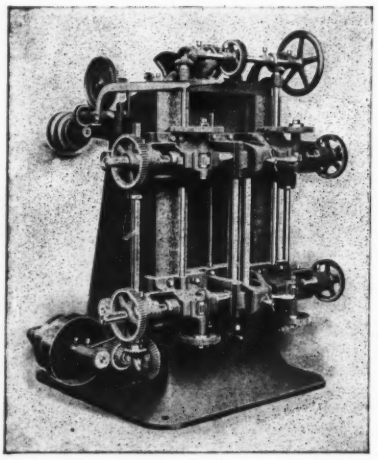

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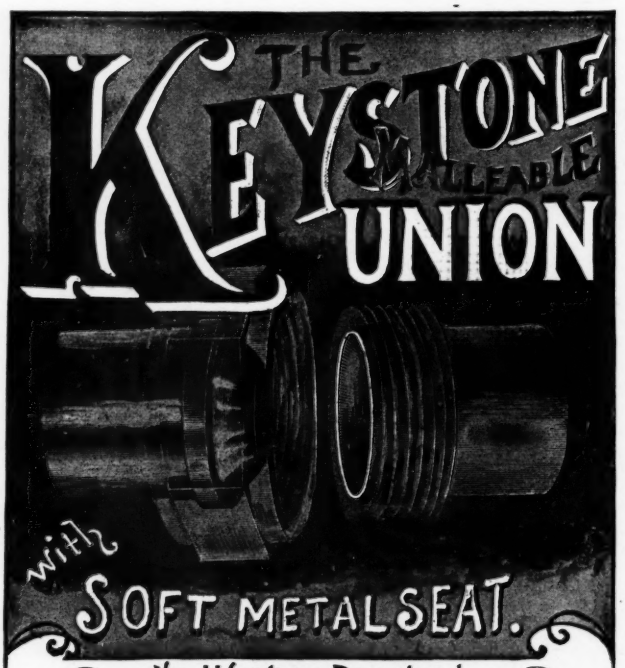

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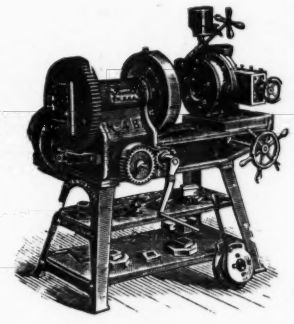

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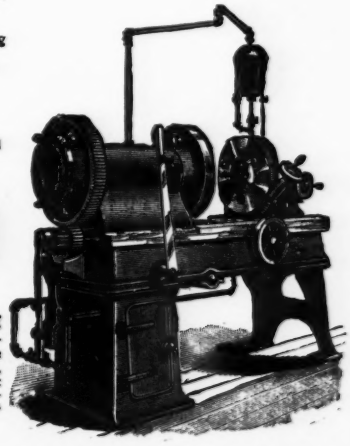

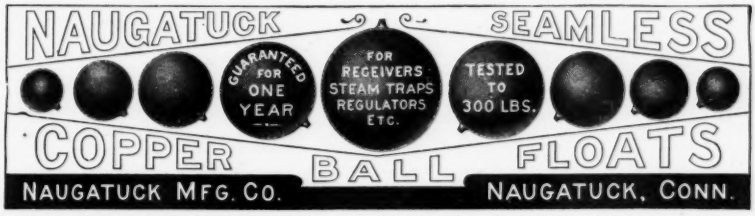

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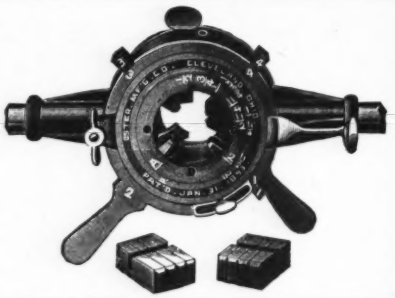

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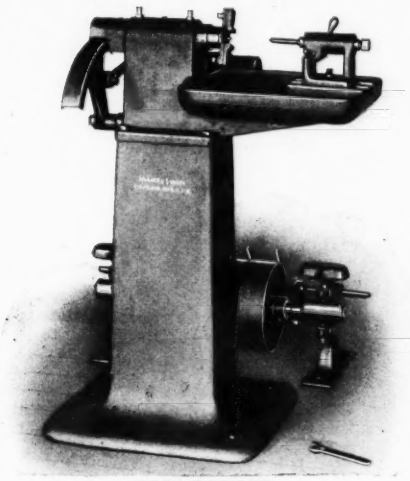

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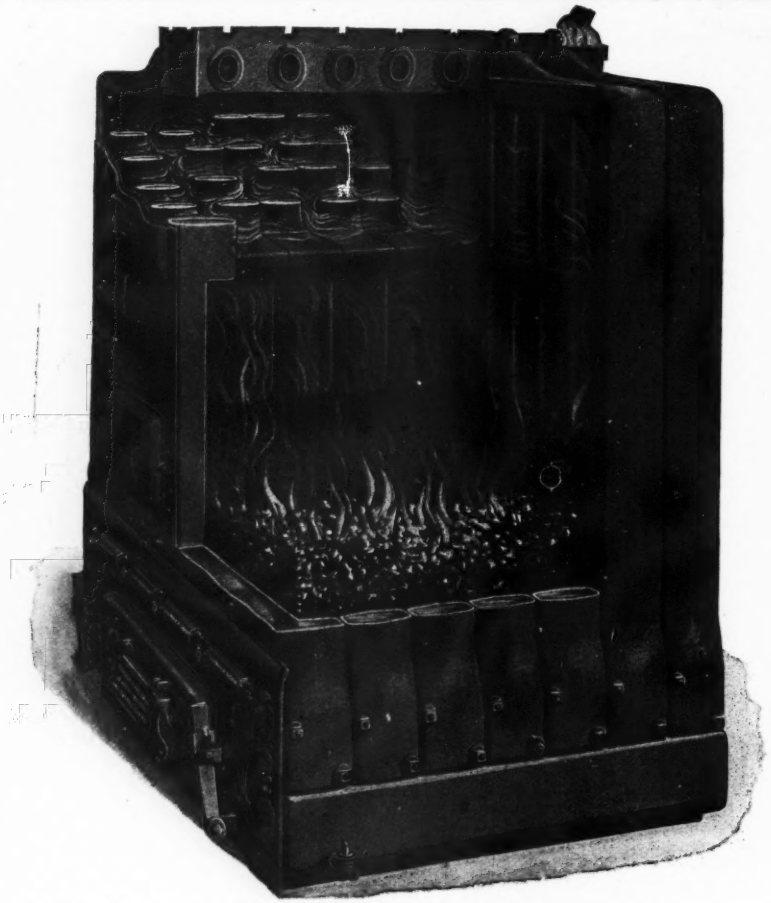

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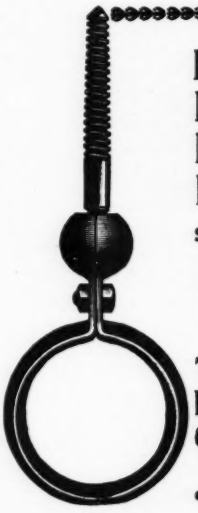

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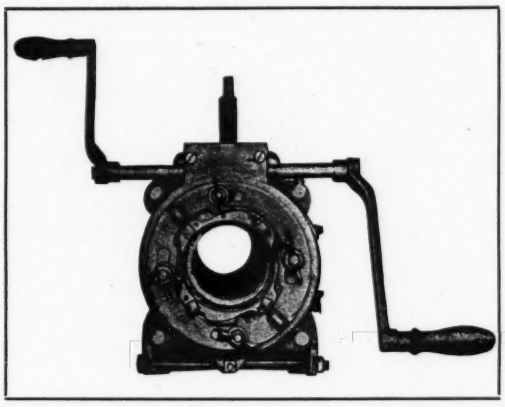

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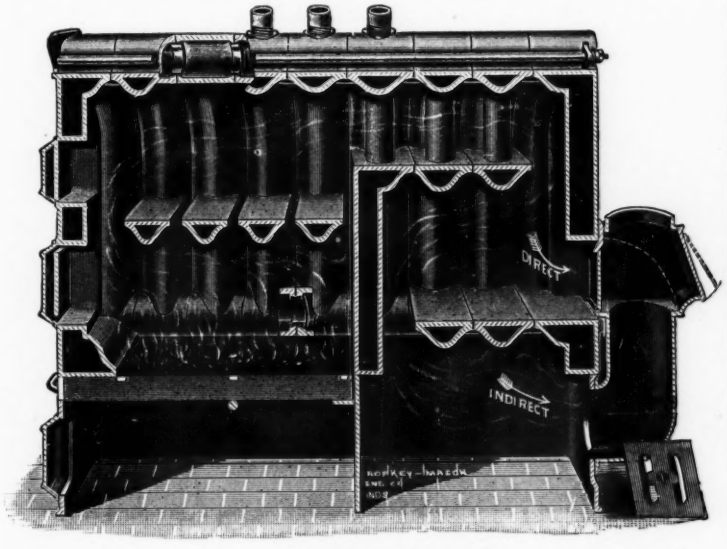

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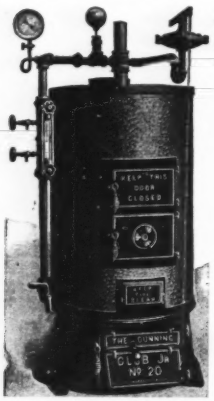

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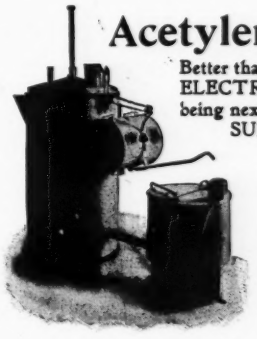

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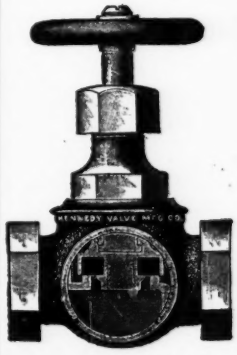

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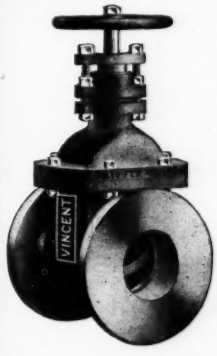

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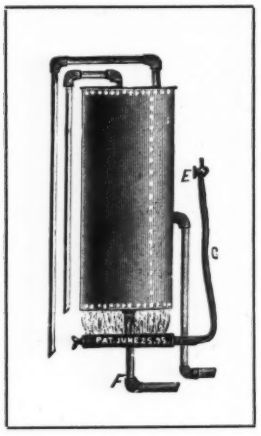

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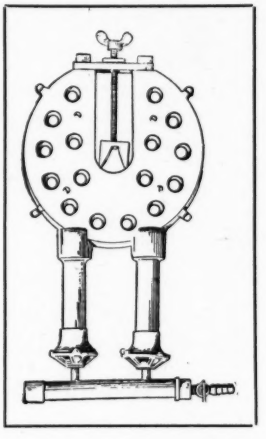

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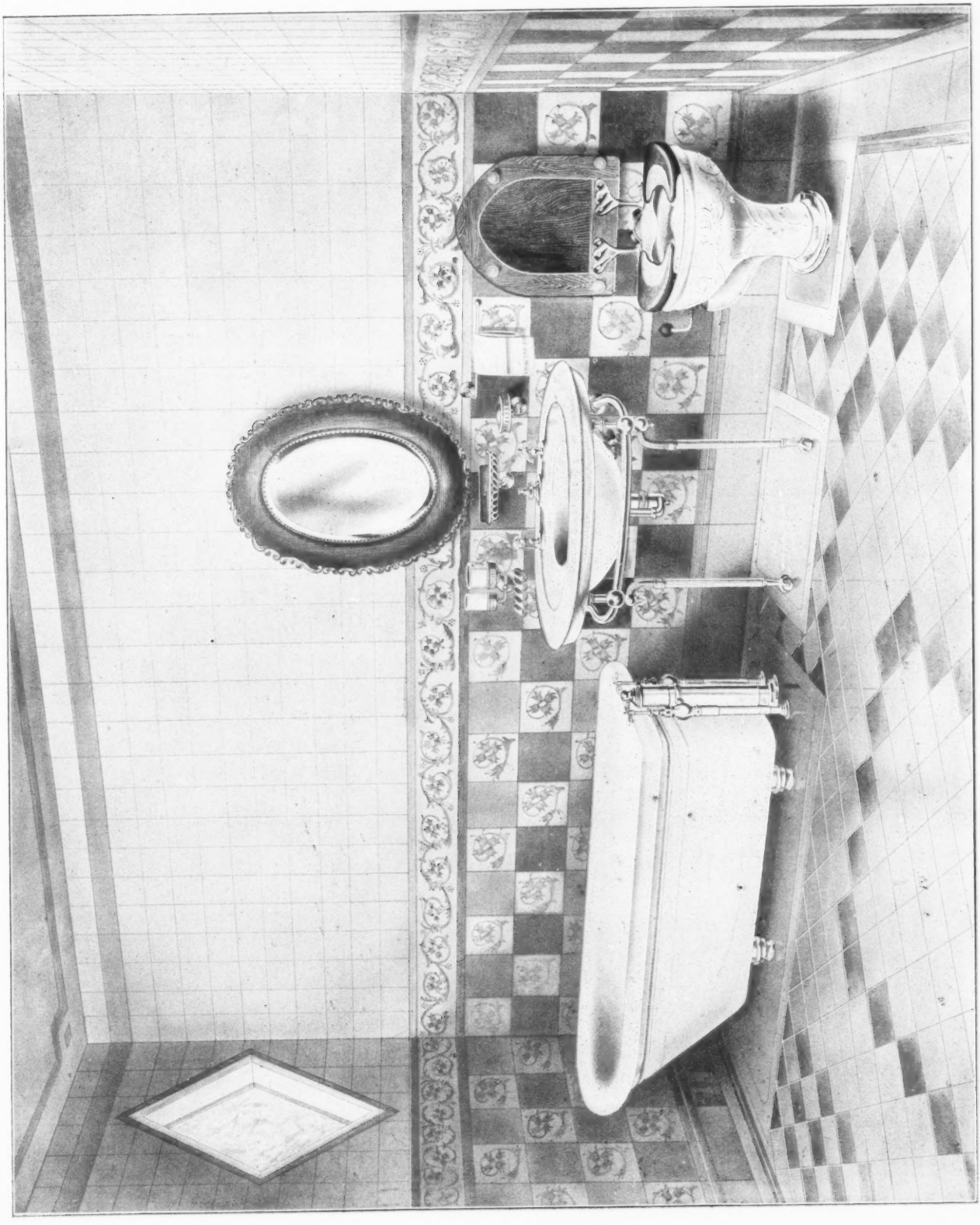

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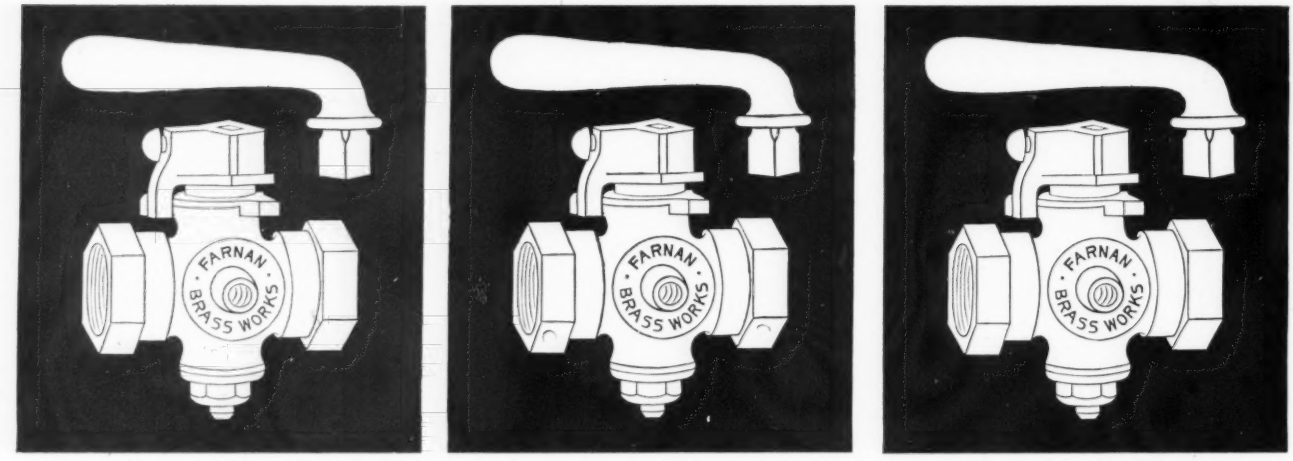

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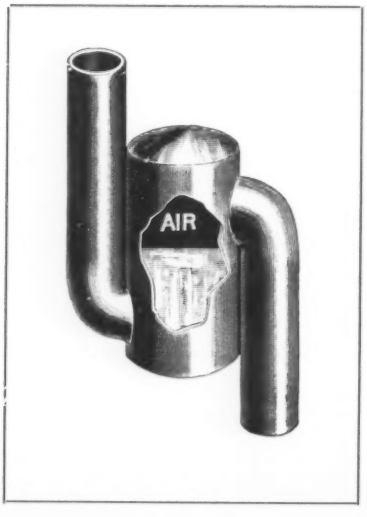

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Whole No. 132 *OCTOBER FIFTEENTH, NINETEEN HUNDRED* *Vol. 20, No. X*

House Building from a Surgeon's Standpoint.

By Hal C. Wyman, M. D., Detroit, Mich.

THE title selected for this paper is perhaps a little ambiguous. I wanted to describe some of the things found about badly constructed houses which interfere with the health and happiness of the inmates by causing something besides malaria. Everybody talks about malaria, until the word is made to represent so many human ills that it is difficult to assign it any scientific meaning. For one I would like a change, after having heard the varied use of the word for many years, and think it must be possible that other diseases have their origin in faulty dwellings. One case of hip-joint disease, which I think is often caused by bad stairways, represents a larger sum of human suffering in the two to ten years commonly comprised in its course, than twenty cases of the varied and uncertain malady known as malaria. I have wearied of the constant ding dong about sewage and ventilation, and desire to hear discussion about something besides traps, drains, fans, shafts, flues and closets. When we consider the immense influence which accidents have upon our death rate, we see the need of something to diminish their number. The American Public Health Association has endeavored, by means of prize essays, to popularize means for the prevention of accidents in large manufacturing institutions. Rules for the care of injured persons and lectures to employes of railways have told how and what to do for the aid of the wounded before the arrival of a surgeon, but much of the information set forth in that way may be summed up in the answer of the medical student who, when asked during his final examination for the doctor's degree what he would do in case he was called to attend a man with a bleeding artery, said he would run like blazes for a doctor.

Stairs.

For these implied reasons I wish first to speak of stairs because they are in many instances the source of accident and serious disease. Often the stairways are too steep, the tread being too narrow and the rise too high, and persons are consequently quite likely to fall. The ideal stair would be represented by a tread double the width of the rise. That is, a tread twelve inches wide would have a rise six inches high. In former years, when ceilings were low, houses not infrequently contained stairways with a tread of twelve inches and a rise of five; but such a step to our unaccustomed feet is not easy and therefore not always safe. Children suffer more frequently than adults from defective stairs. The not uncommon picture is presented of a mother or some guardian of the family leading a little one of two to five years down a stairway, holding on to the little hand, with the arm extended above the head; the stairway steep, the rise perhaps seven or eight inches and the tread not a whit wider. The little one, with his weight half suspended, suddenly drops upon one hip in such a way as to bring the full weight of the body upon that part. This act being repeated as many times as there are steps in the stairs, gives us one of the surest means of producing the dread calamity known as hip-joint disease. When we think of the extreme frailty of the hip joint in these little ones, how the bones in the hip are not yet firmly united together, we appreciate how necessary it is that the weight of the superimposed structures should be evenly distributed over both hips and all the tissues composing the joints, in order to avoid one part being subjected to more strain than another, and in consequence more likely to become the seat of disease.

That portion of the tread of a stairway which projects over the rise and is known as the nosing often projects too far, so that in ascending, old persons, whose muscular sense has become impaired by age, are very likely to stumble and fall, frequently producing fracture of the hip or other portions of the body. My own experience in accidents resulting from this cause embraces several cases of fracture of the neck of the femur, occurring in persons of over sixty years of age, not one of whom has ever been able to use the limb with anything like comfort or facility.

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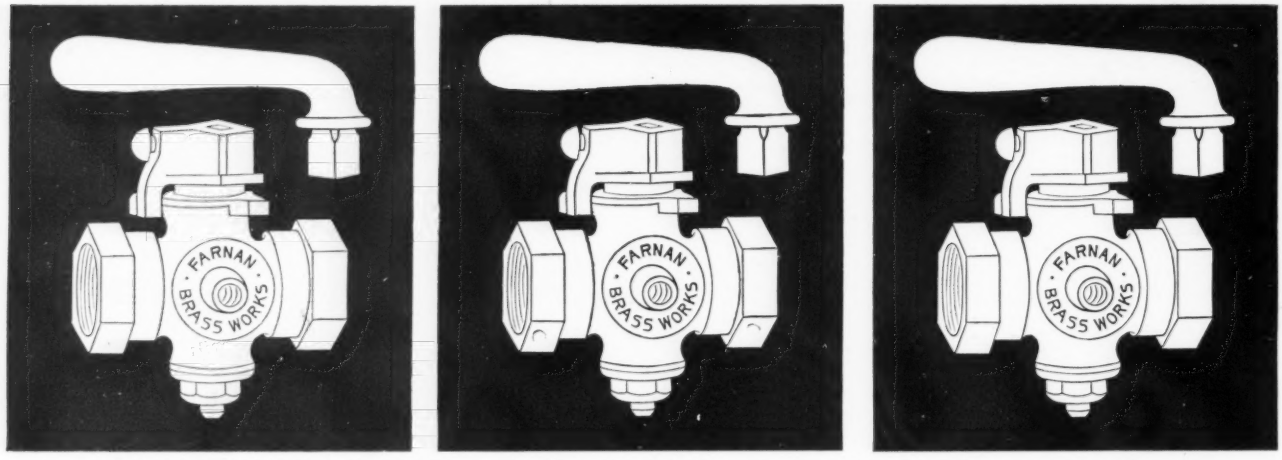
FARNAN BRASS WORKS CLEVELAND OHIO



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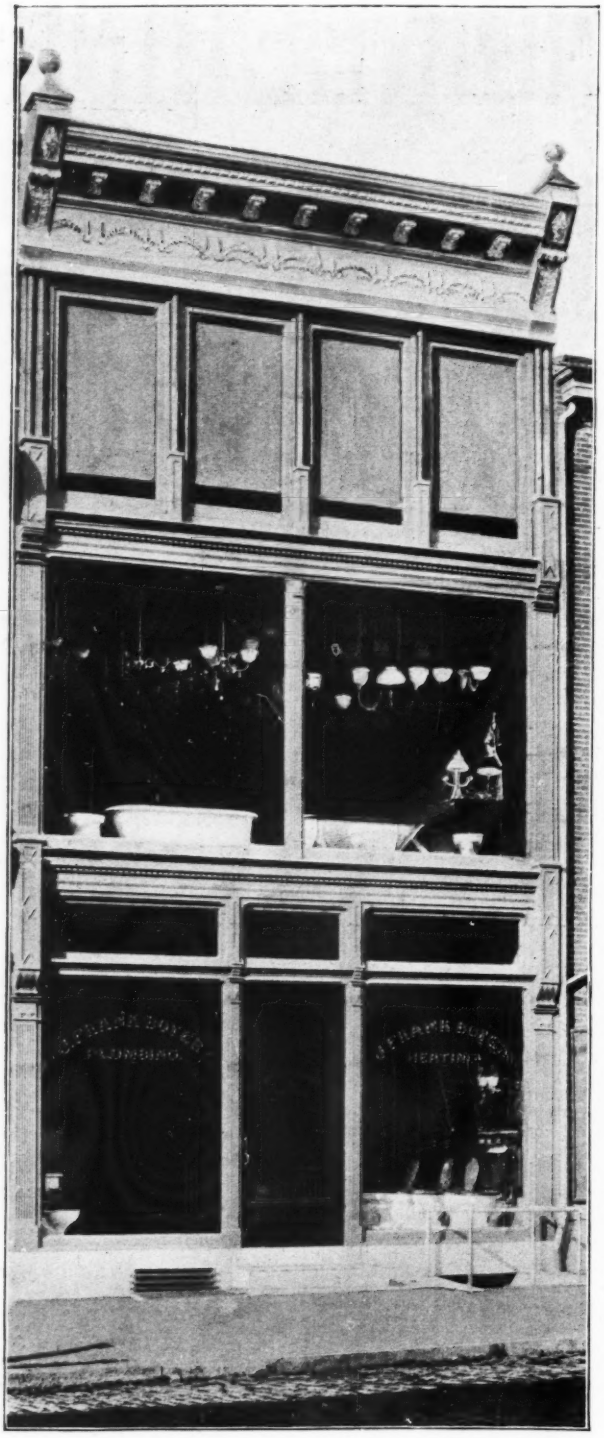
and of the thigh have in my experience resulted from this cause. The turning point in the stairs of the character just described should have ample illumination by a window.



Plumbing Store of J. Frank Bayer, Norristown, Penn.

THE ABOVE HALF TONE PLATE MADE BY AMERICAN PROCESS ENG. CO., CINCINNATI.

The rail and newel-post of stairways should always be of sufficient strength to perform the purpose for which they are intended, namely, to provide a grasping place and to sustain the weight of any person ascending or descending the stairway and to serve as a life rope in cases of falls, or stumbles resulting from unpreventable causes. The fact that children and the younger members of the family are sometimes disposed to use the banister as a toboggan slide, and that they often meet with accident by falling to the floor or striking against the newel-post, would make it appear advisable to have the stairway rail constructed in such a manner as to make sliding on it impossible.

The head room in stairways is often insufficient and tall persons descending such stairways many times receive serious injuries of the head or spine by striking their heads. The writer has known one rather tall lady to get a serious disease of the bones of the neck which will cripple her for life by striking her head while ascending one of these narrow stairs with insufficient head room. The tendency among housebuilders of the last generation to get as much space as possible between floor and ceiling has led to the erection of steep and unsafe stairways of the kind just mentioned. Oftentimes the length and breadth of rooms is less than the height, and such a plan necessarily imposes steep stairs, with narrow treads, high rises and low head room.

No doubt the height between floor and ceiling is largely for the purpose of increasing the quantity of air contained in the rooms; but we should not lose sight of the fact that in the endeavor to secure plenty of fresh air by this means we may impose upon the inmates of the house greater dangers from accidents upon steep and badly constructed stairways than would naturally result from breathing the air of rooms of lesser height.

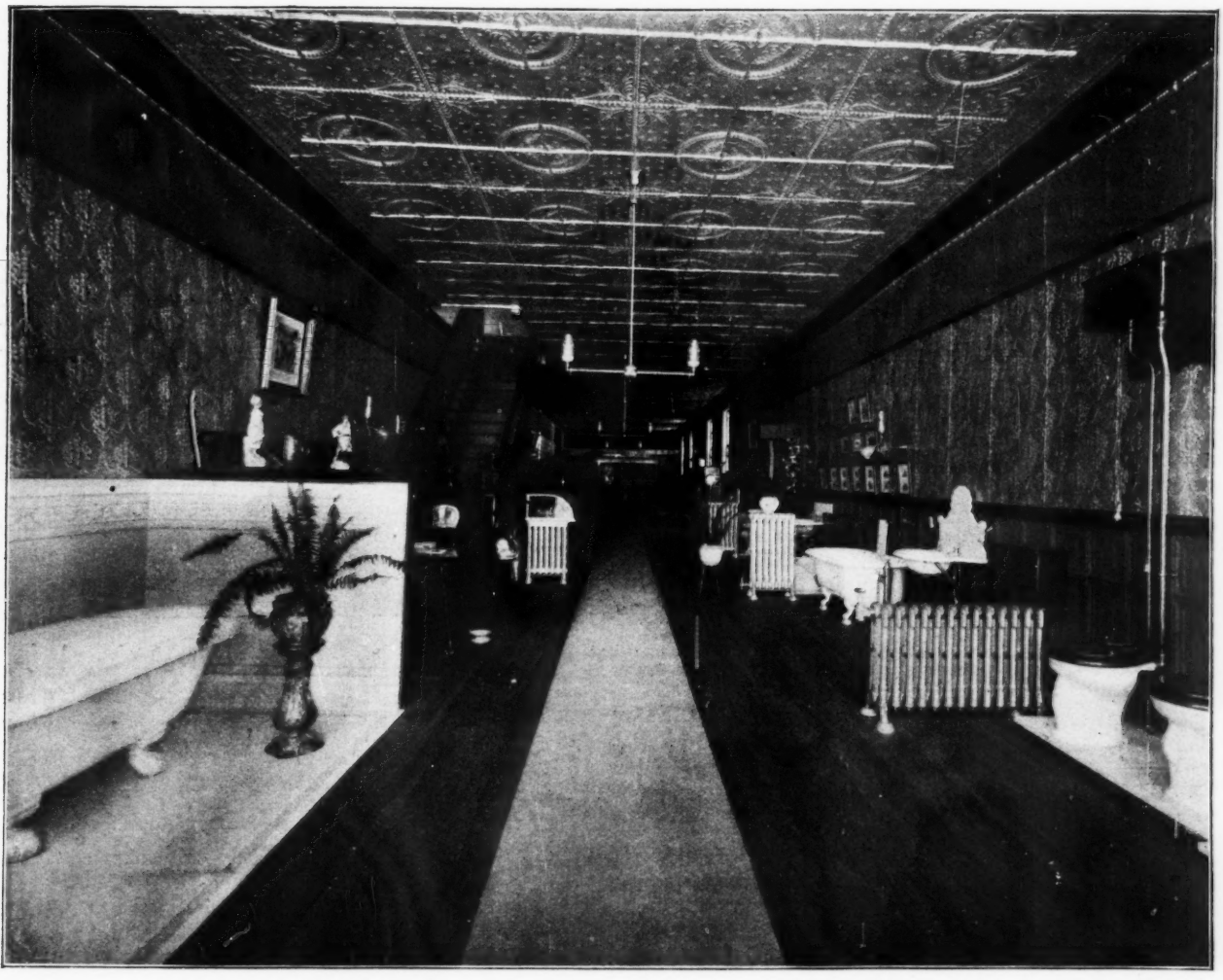
Stairways that are much frequented by children ought, I think, to be covered with thick pads and carpet, the latter securely fastened with strong nails to prevent its catching or tangling the feet; because children are very apt to stumble and strike upon stairways in such a way as to produce concussion of the spine, which often bruises the cartilages between the bones of the spine, and lays the foundation for most serious disease and deformity. If the force of such falls is broken by striking upon something soft, like the pads just mentioned, dangers of this kind would be greatly diminished.

These measures to many may seem extreme; but anyone who has ever seen a case of Potts' disease of the spine, who has noticed the gradual loss of strength, the constant pain, the sleepless nights, the peevish cry, and who has seen the sharp angular curvature of the spine which follows; the fever and the sweats and the pus from deep-seated abscesses, and who has watched over the little one and helped him to use the crutches, the braces or the casts which the surgeon has devised for the purpose of mitigating the disease and preventing the dreadful curvature and deformity of the spine, cannot find fault with any measure, no matter how elaborate or expensive, which gives promise of diminishing any of the accidents which are likely to be followed by this disease.

Floors.

The floors of houses are not always as they should be to give the minimum number of accidents. Unevenness of surface provokes falls which require the services of the surgeon to make bodily repairs. Different rooms sometimes have floors of different heights. A very common defect in the ordinary houses of Michigan and the north and west

is found in having a difference in the height of the floors of the kitchen and dining or sitting room. The L portion of the annex to that part of the house commonly known as the upright, usually contains the kitchen and the rooms in which much of the female labor of the domestic establishment is performed. This very commonly is six or eight inches, sometimes a foot or more lower than the adjacent or upright portion of the house, which in many instances will contain the dining room and will be constantly visited by the women who are working in the lower portion of the house, making it necessary for them in the ordinary pursuit of their labors to step up and down this place innumerable times every day. It is not necessary for me to speak of the various accidents and injuries which result to women from this cause. They must be apparent to every one who will for a moment think of the amount of muscular effort which is necessary to lift the body innumerable times every day to the height represented by the step or steps indicated. I know of no reason why this difference in the height of floors between these two portions of the house should be so common; but if you will take the pains to notice you will find that one-half of the houses being erected to-day in this village will contain the very defect mentioned. Another matter which concerns the floors of houses is that of nailing a board upon them varying in thickness from a half-inch to an inch and a half under every door, known as a threshold. This relic of barbarism, which has occasioned more broken heads and noses than all the shillalahs of old Ireland, is happily quite uniformly left out of modern houses; but it is still found often enough to keep the wolf from the surgeon's door and should be torn out without further delay. Its purpose, originally, I presume, was to compensate for any imperfection in a nice work of door hanging and door framing, which only skilled carpenters can do. Without the threshold, the door-post and the hangings must be perfectly perpendicular, else the door rubs upon the floor and is not easily moved. But there is no excuse for such imperfections in these days of skilled mechanics.



HALF TONE PLATE BY THE AMERICAN PROCESS ENG. CO., CINCINNATI.

Interior of plumbing store of I. Frank Bayer, Norriston, Pa.

New floors sometimes contain ragged boards which sliver easily. I have known several accidents of a serious nature to result from this cause. Striking the bare feet against them, they penetrate and wound the foot. Children playing and sliding or creeping, as they often do, up-

on the floor, have had these splinters of wood driven not only deeply into the skin but even into the joints, like the knee and ankle, setting up most serious disease.

Windows.

The windows of houses are a constant menace to the fingers, hands and heads of those persons who find it necessary to raise and lower them. The frequent want of perfect fixing apparatus for holding the sash to prevent its falling has led to many fractures and in some instances to amputations of the fingers and hands. The weights that are attached to sashes and run inside the frames to serve as a counterpoise should be carefully constructed. Defects here may be very often the source of accident. The person lowering the window, not knowing that the rope is broken, pulls out the stick or lifts the catch with one hand resting on the window sill, and suddenly finds the sash descending like a guillotine, crushing the hand or fingers beneath it. I have known the head to be cut and the deep tissues of the neck seriously bruised by imperfection of the window fixtures. The fastenings by which the windows are secured when closed or held when opened should be maintained in perfect working order and should be of a kind that rarely ever gets out of order. The haste with which people sometimes endeavor to lower or raise a window at the approach of storms, or for other reasons, leads them to grasp these fastenings violently and to exert such an amount of force that when the fastenings do not yield readily, the fingers are often badly torn, and felons and abscesses of the tendons and bones of the fingers and hands result.

Doors.

The keys, bolts and knobs, the fastenings of doors should be in perfect, easy, working order. A bolt which refuses to slide or a knob that hesitates to turn or a key that rubs and chafes in the lock may cripple and wound the hand that pushes or turns it. Felons are very often caused by defects in these articles. Too much force is put upon the recreant bolt and the soft structures overlying the bones of the finger or hand become injured, bruised or broken. Inflammation and abscess follow, giving rise to a felon or palmer abscess. The former often leaves a finger ruined for life, the latter frequently leaves the hand useless by contracting all its tendons, pulling the fingers in upon the palm and distorting it out of shapeliness and usefulness. Knobs are set too near the door edge so that in opening the door the fingers are caught and bruised against the door frame. Springs are sometimes put upon doors to make them shut automatically. They are in some cases too strong and drive the doors to with such force that the children and weaker members of the family are unable to hold them. Serious bruises and crushed fingers and toes have been thus caused.

Gas-fixtures.

Gas-fixtures on the walls are very commonly projected at a point so low that they are an imminent source of danger to anyone groping his way in the dark. They are usually about five feet from the floor and project eight to twelve inches from the wall, are often surmounted by sharp prongs which hold a globe that is sometimes in fragments and located at just the right height to strike the face, eyes, ears and neck, causing dangerous hemorrhages and making frightful scars which sometimes disfigure for life, and have been known to blind.

The chandelier depending from the center-piece is oftentimes so low that the heads of members of the household strike against it. On one occasion the writer had a little patient whose head had been thrust against one of these chandeliers by a fond uncle, whose delight it was to catch up the little one and toss him as high as he could with probable safety. Not noticing that he stood beneath the chandelier, the baby was tossed upward, striking its head against one of the projecting prongs, whose only apparent purpose was to hang jumping-jacks and toys upon. A very serious wound of the head was produced. The habit of tossing babies into the air has very little to do with house building, but if the male members of a family cannot show their appreciation of the little ones in any other way, architects and builders ought to place the chandeliers high enough to be beyond the reach of disasters of the kind just mentioned.

Cellar Doors, Etc.

Hatchways into cellars should be protected by railings when open. One man let his mother-in-law fall down the cellar stairway and was very properly sentenced for life for attempted murder. The stairs leading to cellars should be carefully guarded. The frequency of accidents in this part of the house makes the need of protection of this kind quite apparent.

A great many accidents in houses are caused by falling plaster. One of the lost arts seems to be that of making plaster. For some reason the plasterer trusts the most delicate and essential portion of his art to the least skilled of his kind. The cheapest laborer mixes the plaster and it is not strange that the proportions of lime and sand—of calcium and silicic acid—are not evenly and properly mixed, to insure a good, firm setting plaster, and in consequence it sometimes falls crushing onto the heads of people, occasioning a large variety of surgical injuries. The hair which should enter into the plaster is sometimes of inferior quality; too short and brittle, diminishing the tenacity of the key which projects through the lath and lops over, holding the plaster securely in position. The quality of lime, of sand, of hair and of labor, are factors which enter into the manufacture of plaster, which if not properly observed and carried out make a poor article, that falls from the walls at the most inopportune moments, occasioning maiming and even death to those who may be beneath it.

Chimneys, when not built of proper materials, so that the bricks are held firmly together, become a source of danger to people about houses. High winds dislodge any loose bricks which may be about, fracturing the heads of people with whom they come in contact.

Roofs with loose boards, rafters, tiles, slates or iron railings upon them, should have all these articles removed or securely fastened. The force of winds upon roofs is difficult to calculate and too much pains cannot be taken to guard against any of the articles mentioned being blown off and falling upon the heads of people who may be passing. In cities and villages accidents from this cause are numerous.

It has not been my intention to mention all of the defects which exist in houses, and which are responsible for many of the scars, crooked limbs, distorted spines and sickly bodies of our fellow-men; but to mention a few of the more glaring evils which are most easily remedied.

How to Make Plumbing Ornamental.

NOW that it is deemed more wise, as well as more fashionable,—and wisdom and convenience cause many a fashion—that the various pipes of a house-drainage system to be placed in view, the art has taken on more airs, and it is now necessary, in many cases, to have considerable artistic labor expended on plumbing work.

This improvement manifests itself in several ways. One is to run brass, copper or nickel-plated pipes; another is to gild or decorate the pipes with the same treatment as the room through which it passes; another way is to treat the lead pipe honestly, for what it is, but to expend considerable ingenuity upon the joints.

Interior of plumbing store of Wm. Welsh, Cincinnati.

Plumbers are, as a rule, satisfied with a true joint, bright and shining, with soiling placed on the pipe above and below the joint carefully and neatly. Sometimes architects and owners are not satisfied with the traditional plumbing method, and demand something better, or more ornamental. This demand the plumber must be prepared to meet, and he must have a knowledge of ornamental joints which can be used in such cases.

Lead soil-pipes are seldom used in this country, but there are plumbers and architects who still insist that such a soil-pipe, well-constructed, offers the most perfect pipe known. If lead soil-pipe is used, and its position is such that the joints and tacks require ornamental treatment, an experienced plumber tells us it is preferable to cut the pipe in lengths of six feet. If used longer it would be necessary to place a pair of ears in the center of the length, which would scarcely harmonize with the style of a joint he describes. In using lengths of six feet, each joint (which is a stay also) is uniform with its neighbors.

The style of the joint is often determined by the architect. One which we have seen shows a round joint, wiped and brightened as usual, with trefoil ears below and above the joint. Around the pipe four lines of astragal mouldings are carried, being on a line with the top and bottom of each of the ears. The moulding has a tendency to relieve the appearance of largeness of the round joint, and makes a neat and tasteful effect.

Another way of treating a soil-pipe joint is to make it with astragal ornaments. In this case, instead of a round joint of the common kind, a flange, or socket, joint is made so as to form part of an astragal. In preparing the ends of the soil-pipe lengths for this kind of a joint, care should be taken properly to square both the socket and spigot ends of the lengths so they may fit together truly and evenly. The socket end should be opened enough to allow the spigot end to set into it about an inch and one-quarter, and the inside of the socket tinned to a corresponding depth. The spigot end should be shaved and tinned about two inches at its end, or enough to permit the joint to be wiped and trimmed up so as to correspond with the lower end of the astragal.

The astragals, as all plumbers should know, are small mouldings of a semicircular section with a fillet above and below. They may be formed from a piece of three-eights, one-half, three-fourths, or one-inch lead-pipe; but the fillet, in this case, has to be worked on them. The best way is to buy them ready cast, about one foot long, or cast them yourself in an iron mould. They are fixed around the soil-pipe by bending them round and soldering them at the back with the copper bit. In plumbing work, the astragal is purely an object of ornamentation, it serving no useful purpose.

The ears are then to be soldered on. These are either cut or cast into the desired patterns. The edge of the ear is then soiled, shaved and bent, and wiped on the pipe in the ordinary manner.

The same spigot and socket joint can be made by floating the interstice full of solder with a copper bit instead of wiping it in so as to form a part of the astragal. In this place the top astragal is placed just below the bulge of the socket flange. It is placed there because if it was brought to the edge of the socket length it would be quite difficult to get sufficient heat directly on the joint to sweat the solder down to the bottom of the tinned surfaces. As the astragal is hollow it acts as a non-conductor of heat, and there is danger of melting the lead pipe before the solder is made to flow around the joint as it should. Should the astragal be brought to the edge of the socket-pipe, the ear would have to come with it, and it will be seen that, in such a case, the ear would be melted before the joint would flow.

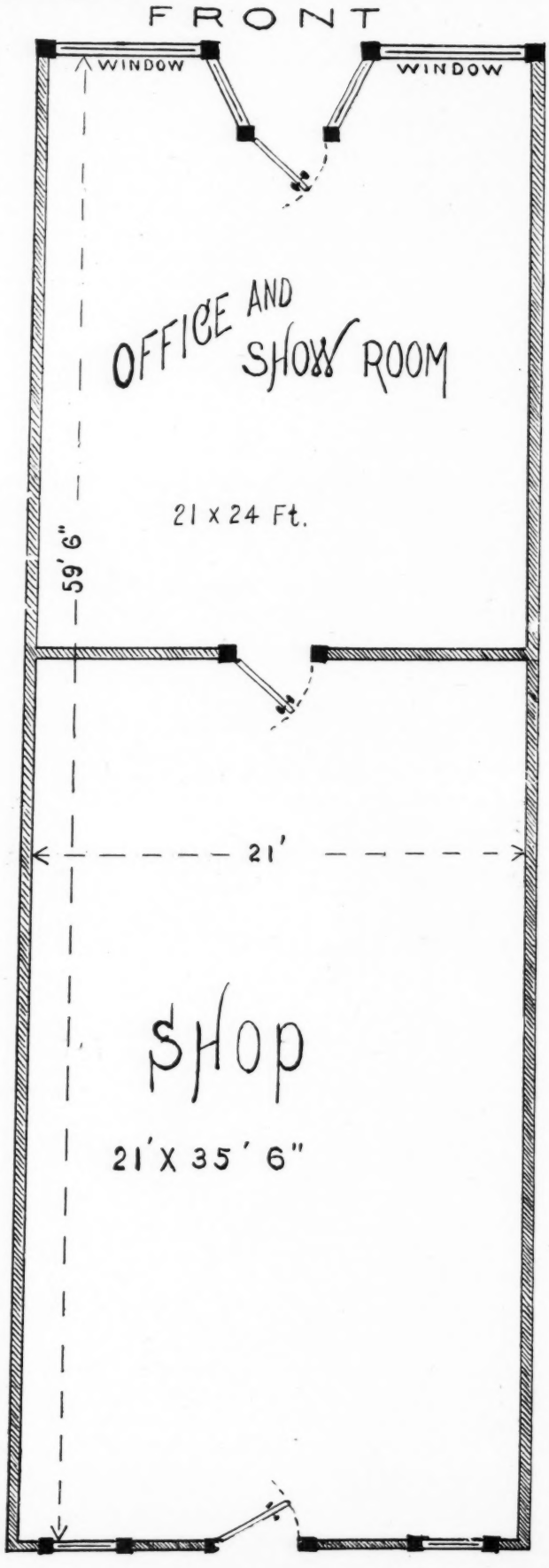
A $5.00 Prize for Best Idea.

A PRIZE of $5.00 will be awarded to the sketch which shall most satisfactorily answer the following query by a subscriber to "Domestic Engineering." Sketches should be made in ink and show complete arrangement of shop and office. A written description would also help. The subscriber who asks the question shall decide who offers the best sketch.

Please give us your ideas upon the most satisfactory arrangement of a shop and office and show room in building a sketch of which is sent. Our show room should contain two lavatories, two tubs and two closets to begin with, more added later.

Shop provides space for a full stock of wrought and cast iron fittings, but no space for cast or wrought iron pipes or for cast fittings. Have two benches, on one of which is a Forbes hand power six-inch stock.

What is proper size and height of both plumbers' and fitters' benches?



FROZEN WATER PIPES.

By C. W. Belden.

MANY people, even intelligent plumbers, believe that the expansion which takes place when water freezes in a pipe, occurs when heat is applied to thaw it out. The fact is, however, the expansion is all over when the water is solidified.

The fact that lead pipes do not always burst when frozen is owing to their great ductility and their ability to yield to the pressure. Pipes are most likely to burst at the top of a bend, for the reason that the ice which forms at first in minute flakes, rises as far as it can. A steady flow of water through the pipe does not destroy these flakes, but prevents their accumulation at any one point.

The exact manner and time of expansion in frozen water has been the subject of many theories. I submit the following as plausible, if not scientifically exact:

When water has cooled to the freezing point, there first appear fine lines of net-like appearance. These steadily

increase by added particles that rise to the surface and are attracted to each other. The density increases until it becomes what we call solid, but it is still full of small fissures or pores. Then the water below, which is still in a liquid state, is sucked up by capillary attraction into these pores, and the expansion takes place. Then the pipes must burst or stretch.

It is likely that the particles of water drawn into these pores are, in turn, chilled and then contracted, forming other and smaller pores, into which lesser particles are drawn, and the process goes on until the formation is wholly solid.

In confirmation of the theory, note the expansive power of wood when confined and saturated with water. Wedges driven into holes drilled in rock, and saturated with all the water they will take up by capillary attraction, will expand with force enough to split granite.

Why water has this disposition to climb into cellular spaces is another question, but it is a well known fact. One of the best illustrations of it is the common one shown when a piece of lump sugar is placed in half a teaspoonful of coffee. The liquid rapidly ascends, and, more wonderful still, when one lump is placed on top of another, the coffee will leap across a considerable crevice, and mount to the top, providing the base of the lower lump does not dissolve and cut off the supply. In this way water more than "runs up hill"; it cuts away from the usual laws of gravity, and "runs" perpendicularly.

Drain Testing by the Application of Water.

By J. R. Anderson, C. E.

THAT all drains passing underneath a dwelling should be absolutely water-tight ought to be a primary consideration with sanitary engineers, in order to render an escape of sewage from the same into the surrounding earth a matter of impossibility.

For the purpose of ascertaining whether or not a drain is sound, it is now customary to apply to it the hydraulic or water-test, which consists of plugging the drain at the lower end and filling it with water; so that by taking observations at a point near, or at the upper end—in most cases a gully—it is possible to form an approximate conclusion as to the extent of the leakage, indicated by the rate at which the water sinks or diminishes in height at the fixed point.

Although a drain might be found to be in a leaky condition through the agency of the water test, it does not in all cases of necessity follow that the same drain would permit leakage to take place during the time in which legitimate work would be going on; that is to say, during the time in which the drain would be serving to carry the sewage matter of the house away, or, in other words, while an ordinary flow of sewage existed along it, in which case the drain, if a 6-inch one and laid to a fall of about one in sixty, would be running considerably less than half bore, calculating the maximum ordinary flow not to be in excess of two cubic feet per minute, this amount being a good maximum flow in the case of most house drains.

In consequence of the application of the water test to a drain, a pressure, though somewhat a slight one, is put upon the pipes, which slight pressure in a large number of instances in which the pipes at the outset were not tested is sufficiently great to force and disturb portions of the jointing material, and thus establish a leaky drain, although not absolutely allowing leakage to take place previously to the application of the test and while fulfilling its proper function.

A case of a like nature came under my notice a short time back, in which a drain was capable of being charged, and of remaining so for a somewhat brief period of time, at the expiration of which a rapid diminution in the water level at the upper end of it—in this case a gully—became apparent, doubtless due to a disturbance having been occasioned in the jointing material at some spot through the medium of slight pressure.

By some persons the water test is looked upon as being a much too severe and unsuitable one to apply to a drain of comparatively old construction, well put together at the outset, but not having been tested on completion.

I am of the opinion, however, that the conclusions formed by others, after having noted the following facts, will tend to concurrence in the matter that the water-test is the only reliable and suitable one to apply to house drains under ground, bringing into practice the now much-used peppermint and smoke tests in connection with the testing of pipes in existence above ground level only, as, for example, soil and ventilating pipes.

A drain at a distance of some feet below the level of the ground might probably on being severely tested with peppermint and smoke, prove sound, no escape of smell or smoke being apparent, but in reality, however, it might be leaking merrily to some considerable extent.

For the purpose of a supposition, imagine, in the case just referred to, the soil to be of a light, gravelly nature; then I am of opinion that such a condition of things would be dangerous, if not highly so.

The reason for forming such a conclusion is that gravel is a very porous soil, holding in its interstices a large volume of air, roughly speaking, a quantity equal to one-third of its bulk, and in such a case the rooms near the ground level in a house constructed on this spot would partake of a certain quantity of foul ground-air, more especially so should the house be closely shut and well warmed by fires. The ground-air gaining access to the lowest rooms of the house by means of ventilation, in consequence of a difference of temperature between the two places, and escaping from a soil contaminated, in a measure, with sewage matter from a leaky drain, might be the agent of disease; that is to say, disease germs, should any such exist in the soil, might be conveyed into the house along with the ground-air, and probably cause illness among the inmates.

It is possible for a drain in regard to its legitimate work to be in sound condition, but on the contrary in regard to

the water-test. Such a condition of things, however, is not nearly sufficient since a drain at some period of its life is highly likely to become chocked at some point in its course, and in consequence of the gradual backing up of sewage matter, it, if not absolutely tight, would afford means for the exit of liquid sewage, the solids remaining behind until the whole length of drain from the point of obstruction to its upper extremity became wholly choked. The reverse would occur, however, in the case of a tested water-tight drain, since there would be no means of exit for sewage matter into the subsoil; the same, in consequence, heading up until it overflowed at the gullies, etc., giving a visable sign of the existence of a stoppage which could be speedily cleared, giving rise to no greater injury than the inconvenience of the stoppage and the attending mess.

Probably the obstruction would be removed before totally filling the drain, as happens in many cases by virtue of its own pressure or head.

It is equally as necessary that all manholes in connection with a drainage system should be perfectly water-tight for precisely the same reasons as have been pointed out in the case of drains.

As regards the periodical testing of drains, the water-test for such purposes should be resorted to, since it is possible that in the course of time a slight settlement might take place in the pipes and form an exit for sewage matter, which exit by the use of the peppermint and smoke tests would not be revealed, nor yet give rise to any noticeable irregularity in the flow through the drain when observed on passing through the manhole at the lower end.

I would now say a few words in favor of the greater adoption of iron pipes, coated with a rust-proof solution and jointed with caulked lead for house-drains, and the testing of the same when first laid by a hydraulic pressure much greater than that obtained by simply fixing up the drain to the basement level, which can be obtained by filling up the soil-pipe to a requisite height, and if two or more vertical pipes are in existence in connection with the drain by dividing the pressure amongst these.

By the adoption of such a system of testing, sound and reliable work would be insured, thus putting a drain in a position more fit to withstand the application of the water-test on future occasions than probably would be the case with stoneware pipes. The long lengths in which iron pipes are cast necessitate, in comparison with stoneware pipes, a much smaller number of joints, and, as a consequence, there would be less liability to fracture and disarrangement in the course of years.

In the adoption of such a testing process all manholes in connection with the drainage system should be put under the same pressure, thus making sure of a thoroughly sound and tight system. The covers to the manholes would of necessity require to be strongly made and provided with suitable fastenings, but just now there are several patent covers in existence well adapted for the purpose. Many manholes are made with two covers, the second one being placed low down within the chamber near the level of the top of the drain pipe, in which case it would not be necessary to test that portion of the work between the upper side of the lower cover and the top one. This is an advantage to be gained in using double covers, since a less air space is provided for the accumulation of foul smells within the chamber; and, moreover, in the case of a stoppage, the ordinary manhole forms, for the time being, a place for the retention of such filth, or, in fact, a cesspool.

Since it is imperative that all drains passing under houses should stand the water-test, it ought to be the duty of the sanitary engineer, when called upon to inspect and report on the sanitary condition of a building, to make use of the water-test, employing volatile liquids and smoke for pipes above ground only; but before the application of the test to a drain under circumstances akin to those in the following instance it would be a wise plan, in order to avoid running any risk, to get full permission from the owner of the drain to do so, although of a truth, I am of the opinion that, having once been granted to make a sanitary survey, the water-test could be applied minus any risk, since it is not possible for a survey to be made thorough unless such a survey has been made use of.

The case I wish to instance is as follows: An individual, desiring of ascertaining a knowledge of the sanitary state of a furnished house which he had arranged to occupy for a certain time on condition that the drainage arrangements are good and sound, employs the services of a sanitary engineer to report on the same, having gained permission for such work from the landlord or owner.

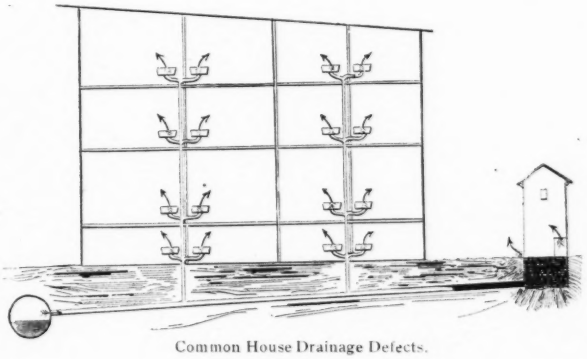
The engineer, after having tested the drains with water, finds that these are in a leaky condition and reports to the individual concerned in accordance with the fact, who refuses to enter into occupation. It is possible that the possessor of a drain would wish to take action against the engineer in order to recover a certain sum of money for damage rendered to it in consequence of the water-test having been applied, which without doubt would leave the drain in a state more leaky than it was previous to the test. Whether or not such an action could be proceeded with successfully, however, I know not.

In conclusion, I would add that when a drain with branches, not laid bare for the whole length, has been tested and found leaky it is a good plan to disconnect the branches at the junction with the main in each case by a plug and test the latter separately in order to ascertain whether or not the defects are in existence in the branches and not in the main.

It is also a good plan before testing a drain about the soundness of which doubts are entertained, roughly to calculate its holding capacity, so that if a corresponding or little larger volume of water did not, when introduced, charge the drain, a conclusion that the same is defective might be arrived at without pouring into it a much larger quantity and unnecessarily saturating the sub-soil with the water.

Examples of Defective House Drainage.

IN those portions of large cities which are always built up before the arrival of the sewerage and water-supply systems, there is almost certain to be a bad condition of house-drainage after these public conveniences are brought into the nighborhood. The house is usually built first; the privy-vault is dug soon after; a sewer then comes in order after a few years and the privy-vault is connected with it often by a wooden box-drain, seldom by a tight drain, this drain running, in the majority of cases in large cities, directly under the house. In a few years the public water-supply is introduced into the house and the waste-pipes usually run from a sink; sometimes they are trapped beneath the sink; more often they are not. The waste-pipes are led down to the drain previously constructed, which discharges into the sewer. The illustration represents a sectional view of a Chicago tenement house, having a basement and three floors. The house contains one hundred and two rooms, which are occupied by one hundred and twelve persons in thirty-one families. There is a sink in each room, discharging by an untrapped and unventilated

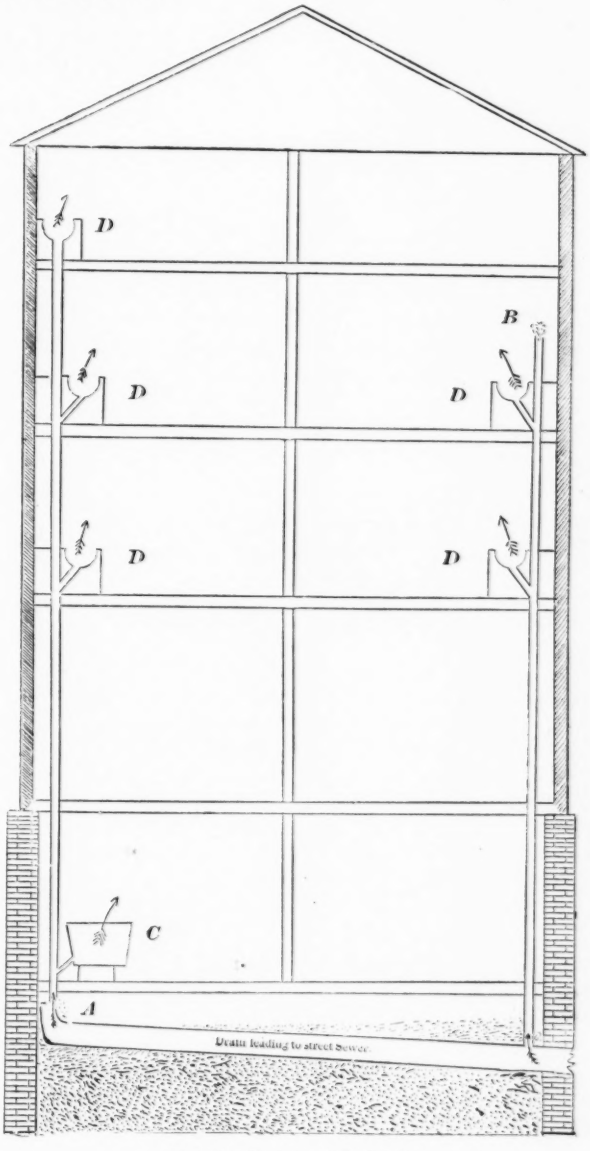


Common House Drainage Defects.

waste-pipe directly into the drain under the house leading from the privy-vault to the sewer. In this case the drain is choked at its entrance to the vault, which overflows its foul contents on the surrounding ground. Sewer-gas had free and unobstructed access to the whole house, and the tenement inspection department promptly condemned the entire system.

In another house the tenement inspector found that the waste-pipes entered an old wooden drain, which passed directly underneath the house, and which was rotting away and broken apart, allowing the waste from the whole house and the sewage from the privy-vault to run out upon the ground beneath the basement floor. The space from the drain to the floor was nearly twelve inches, and this was filled with the green slimy mass.

In another instance a house having two floors and a basement, and containing eighteen rooms, was occupied by twenty-nine persons in ten families. The drain running under the house was broken and the sewage had completely filled the space under the basement floor. The filthy condition of the front part of the basement is almost indescribable. There are two rooms about ten by fourteen feet large by six feet high. In these rooms are six persons. The walls, ceiling, floors, and all the contents of the room are in a very filthy condition. Some of the flooring boards are rotting away, and stepping upon them, the stagnant water underneath squirts up and over the floor. The stench is exceedingly bad.



Defective Drainage in a Hotel.

Under one house the inspector found an old wooden drain leading into a box drain in the street, both of which were choked, and caused sewage to collect in a bubbling, gaseous mass under the floor, and in the street gutter. A new sewer was ordered in the street, and a house drain properly connected.

The possibilities which may be attained in defective drainage are so vast and varied that Domestic Engineering thinks it desirable to present occasional examples of what is

to be found in any large city. The cut presented in this issue represents a section of a double house, three stories, attic and basement in height, and occupied as a hotel, accommodating about sixty persons. There were five sinks in this building, which were located in sleeping-rooms. These sinks are represented as wash-basins. The sinks were connected directly—without traps—with the waste-pipe, which entered the house-drain imperfectly and without a trap. In the cut, A represents the imperfect, unsealed connection of the waste-pipe with the house-drain leading to the street sewer. The waste-pipe was so located that it did not discharge directly into the drain, but a portion of the slops ran over the edge of the drain to the ground beneath the basement floor; B represents the end of the waste-pipe which had formerly continued to a sink in the attic room above, but which had been taken out, the waste-pipe cut off, and the top ineffectually stopped with a newspaper. The stench in this room made it impossible to use the room; C represents the basement room, which was used as a Chinese laundry, and in which was a large sink connected with the waste-pipe by an untrapped connection. The stench in this room, coming through the sink-pipe and through the floor, from the slop-soaked ground beneath, was very bad. D, D represents sleeping-rooms containing the sinks, which freely admitted air, not only from the sewer, but through the imperfect joint with the house-drain, from the ground beneath the basement. To add to the criminal construction, the careless guests had become accustomed to use the sinks as urinals. There was much sickness among the permanent occupants of the house. The premises were improved by providing a trap under each sink, and continuing the waste-pipes up through the roof.

The Progress and Advancement of Plumbing.

PROGRESSION and success go hand in hand, and one cannot be successful without being in some manner progressive. Search the world over, and the fact will come back to you, if not with added force, at least with striking realization, that our most successful merchants, manufacturers, professional men and mechanics, are those in whom the most prominent trait is progression.

This assertion, more than ever, holds good of plumbing in its true sense, and if, as some assert, plumbers are successful in a pecuniary point of view, I must as confidently say, that they are at the present time as progressive, probably more so, than the average mechanic. Plumbing is, indeed, a progressive science; few realize the rapid strides which have been made during the present generation, few indeed understand the pre-requisites, essentials and training which combine to make the competent and successful plumber. Knowledge acquired from long training and study, experience gained, after continuous and patient research, honest desire for success, a susceptible disposition to accept the results of the investigations of others, have contributed in the make-up of the plumber of the present time.

The plumber of the past was a workman, plain and simple, versed, we might say, almost to perfection in the use of tools and the performance of his work. Beyond this the demands of his business never led him. Every job was done alike, varied by a regard for decorations, and a dexterous manipulation of lead pipe; the demands of his calling made him a plodder, honest and industrious, but as regards new methods, new ideas, obstinate, as a rule. To-day the science of plumbing demands that the plumber shall be not only a workman, but that he shall be a skilled mechanic, and beyond that he shall be familiar, if not from actual study, at least from experience in certain laws of physical science, with laws which govern hydraulics and ventilation.

The modern science abounds with examples, which call for the most thorough and complete knowledge of these laws. The plumber of the past had but to provide the necessary supply and waste pipes, to hide them from view, if such were a possible thing, and to set his fixtures neatly to accord with the construction of the building in which they were placed. The plumber of to-day must thoroughly ventilate, not only the traps and the system of soil and waste pipes which he puts in, but he also must ventilate the building itself in the most approved manner, insuring beyond the possibility of a doubt, security against those poisonous gases which recently acquired science teaches us we must so faithfully guard against.

He should know the laws of hydraulics, that he can understand the capabilities and capacities of supply pipes, the flow in them under varying heads, the loss due to friction, that allowances may be made for the same. He should understand and know the principle of circulation of hot water, that the best results obtainable may follow his work. He must combine with these a knowledge of sewerage and drain laying, as applied to buildings, that he may take a commanding part in all that has to do with sewage disposal, and to them all he must add a trained knowledge of legitimate business for his own protection.

If there has been progression as regards the plumber, there has also been great advancement in the methods of executing pulmbing, and also in the manufacture of the stock and material used. The introduction of water, for domestic purposes, has superseded the force-pump and tank for the cold water supply, although tanks are used in many places where the pressure is too great for safety. Pumping the water was laborious, and the supply was limited. The water stored in the cistern soon became stagnant and unfit for use. A sufficient supply of hot water is very essential. Years ago the tank or boiler was located at an elevation

high enough to supply all fixtures; long pipes connected it with the water-back, circulating the water, when heated. The first change from this open head boiler, or tank, was the construction of what is called the flue boiler, located in the chimney; the heat from the range fire was carried around the body of the boiler, the flue being so constructed that all the hot gases would be applied directly to it. This boiler was close head, with feed circulation, and return pipes connected at the top, which was exposed. The next was the close head boiler, located near the range, connected to a water-back, or coil, and supplied direct, or from a tank, placed at an elevation above all hot water fixtures.

Many improvements have been made in the construction of water-closets. The water-closet of forty years ago was the pan closet, supplied from the tank with a service box, connected by wires to the valve, with cranks and ball lever operated by the pull of the seat. The inflow of water to the service box would be more than the service pipe could discharge; that when the valve was closed, enough had accumulated to refill the bowl. The first improvement on the service box closet, that came to my notice, was known as the Croton. This closet had a chamber, back of the seat, extending up some two or three feet, supplied with water direct, and served as a reservoir for flushing and supplying the bowl.

After the Croton, valve closets were introduced, of which there were many designs; they are operated with a pull on the seat, rasing the valve by a stop in the lever, or by a cam in the arbor. These valves are slow shutting, and allow the water to pass through them, flushing the closet until they become seated. The hopper closets have been used very extensively, being operated by means of a hopper cock, or a valve connected with the seat. All of these styles of closets were of cast-iron. The manufacture of water-closets and hoppers, entirely of earthen ware, is a great advance. Many improvements have been made in their construction, artistic as well as useful, some beautifully embellished to make them attractive; supplied with water from a small tank through a slow closing valve operated by a chain and pull, the flushing of the closet is easily and quickly regulated.

The construction of bath tubs has kept apace with the improvements. The tin bath of former days was supplanted by copper tubs of similar form, and these were superseded by wood tubs, lined with sheet-lead, and later with tinned copper. Iron baths are used to some extent. The introduction of porcelain baths, and those of enameled iron, denotes progress, they being clean, neat and durable.

Many changes in the construction of wash basins have been made. To the round bowl with the common plug was added an overflow connecting to the waste pipe, and afterward made as part of the basin, connecting directly with the plug. The oval basin was introduced, and more recently the new pattern with standing overflow and plug combined, thereby overcoming the difficulties of plug and chain operated over the slab. There are many devices of this style of basin ,which are being brought into general use, and are accepted as a decided improvement over the old form of basins.

One of the most important and essential parts of good and thorough plumbing, and upon which may rest the success or failure of the work, are traps for the various fixtures. Perhaps throughout the whole range of plumbing there could not be found one to which more careful study has been devoted. The former practice was to manufacture the trap to suit each immediate case in question, by bending the lead waste-pipe into such form as was needed. Experience has taught us that the trap must be self-cleansing, must resist syphonic action, and there has been introduced many mechanically constructed, designed to overcome this trouble. The utilization of the "back air pipe" on traps is also an outcome of the desire to insure against syphonage.

Cast-iron soil and waste-pipes have come into general use, being more durable, stronger and less liable to corrosion by the action of sewer-gas. The heavy patterns were made after the light patterns had been used for years. They are considered preferable, being less liable to breakage in handling and calking. Cast-iron pipes, enameled, have been manufactured more recently, and are reciving some notice. Wrought-iron pipes have been used to some extent of late years, it being conceded that the screw joints are less liable to leak, and are more perfect than the calked joints of cast-iron pipe. The great variety of fittings adapted to the many positions demanded, have been of great benefit to the plumber and his work.

Another important element added to the manner of performing plumbing work, has been the introduction of the principle of ventilation to the systems of soil and waste-pipes and traps. The absorption of poisonous gases by the water in the traps, and the chances of their seal, demanded the extension of the soil and waste-pipes up to and through the roof, to relieve them from the pressure of sewer or cesspool. Back air pipes are also used to assist ventilation and prevent syphonage. Some condemn their use, claiming that traps should be so constructed that under all circumstances enough water should remain in them to insure their seal. Foot vents or fresh-air inlets are used to perfect the ventilation of waste-pipes, but their use has been condemned by some and extolled by others.

I might say more in regard to the improvements which have taken place in the manner of executing plumbing work. I might go into details and trace the cause and effect of the many changes, but it would be but a reiteration of the facts which would show beyond a doubt that there has been progress in the science of plumbing which is truly wonderful, and has kept apace if not in advance of the other mechanical trades.

I cannot at this time forbear saying something in favor of the higher education of the plumber. At the present time the subject of industrial education is being agitated and its methods put in force.

The plumber's apprentice looks in vain for the chance to obtain such an education. No opportuity is offered for him to learn the theories of the business to which he is to devote himself. He has to depend upon himself, with no incentive, except his own will, to obtain the knowledge which will make him a good workman. It is true that something has been done, and we are now, thanks to the liberality of

some philanthropic gentlemen, not without example in this respect.

The trade schools established in New York and elsewhere have been very successful in supplying the long needed want —a school wherein are taught the principles of mechanical trades, including plumbing. They furnish information and practice which cannot be obtained, either from the want of time or the obstinacy of the experienced workmen. The interest taken in the schools by the master plumbers is commendable. Such schools should be established in every city; it would be a boon to every mechanic, and indirectly to everyone, through better and more intelligent workmen.

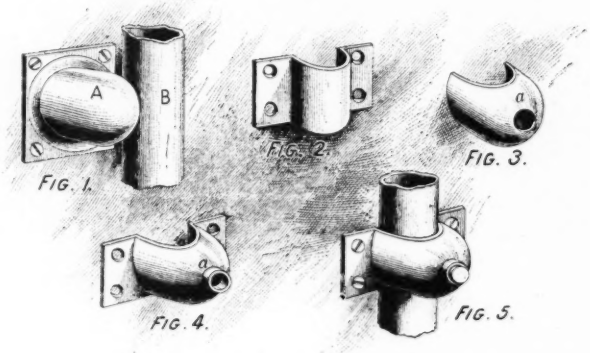
Old Time Plumbing Practice.

By "H. M." in "The Metal Worker."

AN an antique job of plumbing in a house in Pittsburg, Pa., may be seen an old time seat bumper, made of lead and solder, as shown in Fig. 1. The bumper A projects out far enough to prevent the closet seat from striking the flush pipe B. The flush pipe is in the center behind the closet and the bumper at left side, and the seat does not strike it squarely. The bumper was made by "dummying" up the end of a piece of 1¼-inch waste pipe, and joining it to a square piece of sheet lead by means of a flange joint. This bumper is characteristic of much handicraft on the part of the plumber of past years, when lead was used for any and every purpose which his ingenuity could devise to make it serve even temporarily, and without regard to its fitness for the purpose required.

On seeing the bumper, another better and favorite way of making bumpers of lead, when such work was in vogue, was brought to mind. A plain sheet lead strap like Fig. 2 is made first; then a piece of waste pipe of proper size is dummied up at the end, cut off the right length, and hollowed out to fit down over the strap while the strap is in place over the flush pipe. A piece of small pipe is then closed at the end, cut off an inch or less long and set into the larger piece, closed end inward, to receive a cork or rubber bumper. Fig. 3 shows the stirrup piece with place for the bumper A, and Fig. 4 represents the finished bumper, the strap and stirrup having been soldered together. In Fig. 5 is shown the bumper, or rather bumper and strap combined, fastened over the flush pipe.

The bumper and the piece inserted to hold it are sometimes omitted, the end being left plain, as shown in Fig. 1. The stirrup piece is sometimes hollowed out deep enough



Old Time Plumbing Practice.

to flange out and serve without the strap at all. Using the strap makes the best job. It looks better and the arch of the stirrup legs braces the strap at the angles.

Such work as is described here is all but useless these days, but on rare occasions one may find a chance to use a strap of the kind.

How Plumbers Used to Work in Chicago.

By David Whiteford, of Chicago.

AT no time in the history of plumbing has there been so many and such beneficial changes in methods as during the last thirty-five years. Not many of even those who have been concerned in it are familiar with the various stages in the rise and progress of the plumbing trade. Plumbers are not well informed as to what time in the history of mankind they became subjects of public attention and comment. When we read history and look backward to the ages, we may say to ourselves:

> The old oaken bucket that hung o'er the well
> If it only could speak the story would tell,
> How the plumber removed it, and put in its place,
> A long leaden pipe, with an airless space,
> A square box at the top, valves, handle and spout,
> But his pay only came when the water ran out.

The bubbling stream from the mountain gave thought and suggestions to the rise and permanency to the plumbing trade. We read that such was the case in one of the nine aqueducts of ancient Rome, "Aqua Virgo." This one, it is said, is named after a girl who pointed out a spring of

water to some Roman soldiers who were in search of water to drink.

It is reasonable to suppose that, contemporaneous with the aqueducts of Rome, Ephesus, Smyrna, Alexandria and Syracuse, and many of the towns of Gaul and Spain, was the ancient plumber. As to the methods of the ancient and mediaeval plumbers we can only draw our conclusions from the work they have left behind them. Explorers and travelers tell us of the stability and great endurance of the ancient plumber's work. Specimens of their handicraft are extant to-day and may be seen in Rome, Pompeii and on exhibition in the British museum. The ancient plumber, unlike his modern brother, could not have been stinted in time or money in the performance of his work. Neither has the ancient architect been restricted in carrying out his high and lofty idea for the perpetuity of his calling. The specifications must have been immense. Cisterns were often made from sheet lead cast one-half an inch thick, and gutters and pipe were of the same thickness of lead.

We do not wonder at all this grandeur of antiquity when we associate with it the one man idea. The masses being held in servitude by the nabob, for the nabob and for his castle, only did the working men exist. The plumbers of those days, I apprehend, did not need to sing the song of the woodpecker, "If it was not for the length of my bill I would have nothing to eat."

The methods of the ancient plumber and the plumber of the middle ages, and up to the first half of the present century, have been much the same.

The hatchet and the straight soldering bolt, torch, blowpipe, round iron, and the wiping-cloth are found as principle things among their kit of tools. As workers in sheet lead, formers and finishers and makers of lead pipe they were supreme.

Few of the journeymen plumbers of the last decade, were they carried back thirty-five years, would be sufficient for the task of the plumber of that time. Suppose the plumber of thirty-five years ago had been bidden to take a journey and visit some other world (were that possible) and for the time being become oblivious of all that was transpiring on the earth up to the present time. Let him now return again to the scenes of his former labors. Methinks the first thing he would do (providing he had no greater attractions) would be to go to a plumber's shop, ask for a job and prepare for work. What a change he would find in the methods of work since he went away. The old-time workshop has been turned into a store room for materials. The well-planed, straight-edge work-bench is sadly out of repair. One work-bench is to be seen where there were many before, and few tools belonging to the master are now to be found in the tool rack, except gas fitter's tools, which were not known in a plumber's shop at that time. The round irons which were so symbolical of the trade, alas, a candle has to be lighted to look for them and after a search one may be found. One man is to be seen preparing or wiping a joint on a stop-cock, or check and waste-cock. He asks where are all the men, and he is told twenty men are at work on new and old jobs. The charcoal furnace and soft coal stove are no more, but in their place is the gasoline furnace.

The cast-iron trap mould and offset mould have been sold for old iron or may be found lying around the shop, as it is in my case, but never used for its original purpose. The round wood mandrel, for forming lead soil-pipe, may be found, but is seldom used. The plumber of thirty-five years ago is astonished and begins to realize he is not at home in the new order of things and his desire is to know what all this means.

"Why this change?" he asks. The combined genius of man, the invention of new methods, and the better knowledge of the laws governing health in connection with the plumbing trade has made a great deal of change, which I purpose to show in my own way before I get through.

First, let us look at the plumber of thirty-five years ago and review some of the methods of his time. The plumber at that time was a manufacturer, his workshop a factory, and every man a maker of articles from raw material that entered into the fitting up of buildings. The plumber made lead traps, he made the S-trap, half-S and three-fourth-S traps from sheet lead cut to the proper size and width, forming it into shape by beating the lead by a dresser, first making a drawing on the bench with chalk, or working to a trap already made; this is the method that was practised by some in this city up to thirty-five years ago and even later. This was what was called the hand-made trap, and probably the oldest trap, unless it is the D-trap.

The trap made on the mould was cut in strips from sheet lead half the diameter of the size of the trap formed to a semi-circle and worked by the dresser in the neck of the trap some distance up, laid on the mould and carefully beaten so the lead would neither stretch nor buckle in the operation. When this was in shape it was cut to the mould, rasped, fitted, soiled and shaved and then soldered with a copper hatchet or straight bit. To make a fine raised soldered seam on this trap was a fine piece of work.

Workmen could always be found in the shop during the working hours, engaged, as I said, in making articles, such as service boxes for water closet tanks or cisterns, both names being synonymous, lining cisterns for the pan-closet, lining bath-tubs from sheet lead and zinc, chiefly zinc; also making up fine, artistically designed "showers" for bath-tubs. This shower was considered a masterpiece of work, and on it the older apprentices were selected to try their hands. Great pride was taken by the workmen to make the joints of solder look bright and clean. No bath tub was considered complete without one of these showers. Another source of employment for the workmen in the shop was the making of hydrants and sheet washers. The hydrant was made of wood, 8x4 inches, 7 feet long; this was made by the carpenter and fitted by the plumber, almost every house had a hydrant either in the front or back yard. The street washers were 8 inches square and 4 feet long, also made by the carpenter, sometimes by the plumber himself, and fitted up similarly to the hydrant.

I have tried to give you a sketch of many of the articles manufactured by the plumber in his line a few years ago. I will now try and show what changes have taken place since then and what has been the cause of those changes. It may not have been the genius of the plumber alone, nor his inventive capabilities only, that have brought us face to face with the present condition of the plumbing trade. The

assumption, however, is that the plumber, though he may not have been the author and originator of all the much needed reforms in plumbing, has, by the aid of the medical profession and scientists, raised the standard of plumbing, and is meeting the demands of the sanitary press for healthy homes; demands that have been published broadcast to the ends of the earth.

HALF TONE PLATE BY INTERNATIONAL ENG. CO., PHILADELPHIA.

A. J. GREENAWAY, OF DETROIT, MICH.
Compiler of the New Catalogue of the Ideal Mfg. Co

The reformation in plumbing began, without a doubt, in England when the Prince of Wales was sick. Then old plumbers began to think that sewer-air was a dangerous thing to breathe. They began to grapple with the question, which to this day is not yet solved, whether plumbing, with all of its ramifications, should not be removed from dwellings.

The wise men of the trade vied with each other who could find a remedy for this. A feeling of agitation spread all over the land, and Chicago, never behind in a good work, caught the spirit of reform and is now carrying it onward.

In the year of the great Chicago fire, 1871, when buildings began to rise where the old ones formerly stood, began the geat changes in plumbing methods. In the spring of 1872 the firm of Culver, Page & Hoyne was erecting a building on Monroe street between Clark and Dearborn streets. Verity & Whiteford were doing the plumbing. This was the first time I had seen cast-iron soil-pipe used in this city, wrought iron pipe not being thought of for that purpose. These pipes were put together in a manner that would be impossible to leak sewer-gas. The method that was adopted I think a good one. We used oakum for packing, soaked in thick red lead and boiled oil. Three rounds of this oakum was driven into the joints, then one round of dry oakum forced well into the hub of the pipe, and moulten lead was run and swedzed tightly in.

This was the first soil-pipe that I ever saw carried full-sized through the roof of a building for ventilation. The sewer pipe had no fresh-air inlet, they had not come to its use in Chicago yet.

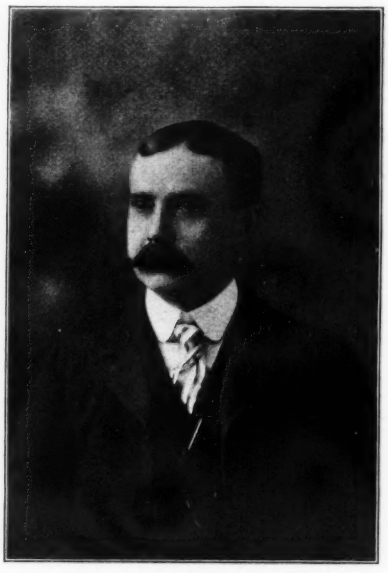
I had put in the smaller pipes from the crown of water-closet traps in 1863 in this city. The purpose was not for ventilation nor for to prevent siphonage, but to keep the soil-pipe from becoming air-bound; of course, it was ventilation in a small way. I will say in this connection that since the great fire in the city, lead soil-pipe had been gradually giving way to cast-iron soil-pipe. Short pieces of lead soil-pipe are used now only for lateral branches.

The dangers arising from lead soil-pipe are too well known to require any remark. In an article published several years ago I showed the danger consequent from its use. The cities of the old world did use, and do use it to-day with great success. But, circumstances alter cases.

The next reform or change in plumbing is the water-closet. The introduction of the first sanitary closet in Chicago was in the autumn of 1872. This closet was a question amongst plumbers and our learned sanitary engineers whether it was a sanitary closet or not. There was a phase in this closet that was good, namely the quantity of water used in every discharge. This feature of its make-up scoured the soil-pipe and drove the fecal matter into the main sewer before it lost its momentum.

The weak phase of this system was very bad. The larger reservoir in connection with the closet bowl was a fouling place, as bad or worse than the pan-closet.

This first water-closet I speak of was the Shanks plunger closet, of Scotland. Those closets were put in the Palmer



HALF TONE PLATE BY INTERNATIONAL ENG. CO., PHILADELPHIA.

DAN R. PATTERSON, OF DENVER, COLO.
Secretary of the Joseph Creswell Mfg. Co.

House, when it was built in 1873. From this time onward we may reckon began the changes in the plumbing system. I can name a few of the closets that were all the rage but apparently have now run their race. The Jennings water-closet, the Zane water-closet and the rest of this class of closets were survivors only because they improved the reservoir and made it a small size.

The water-closets used and the methods of construction up to the time of the Chicago fire were three in number, the pan cistern water-closet, the pan valve closet, the English and Philadelphia hopper closet. These three constituted the pioneers.

The pan closet of twenty-five years ago was identical with the pan closet of to-day. The old pan cistern closet was defective in structure in two particular things, first the supply-pipe to the closet bowl was far too small for a proper flush, one-half inch pipe was not sufficient. Second, the closet bowl, especially the French bowl, was defective in principle. The swinging of the water around the bowl in a whirlpool like shape was not enough to cleanse the bowl nor remove the soil from the trap, or clean the trunk of closet or wash out the soil-pipe. The oval water-closet bowl with the lead or copper fan is preferable to the round French bowl. The force from the fan is greater and washes all parts of the bowl. The cistern pan closet is not used in this city any more and the pan closet is fast following it. The hopper water-closets are still in demand. They are used in basements of houses, under sidewalks and out doors in yards. Some improvements have been made in fitting them up.

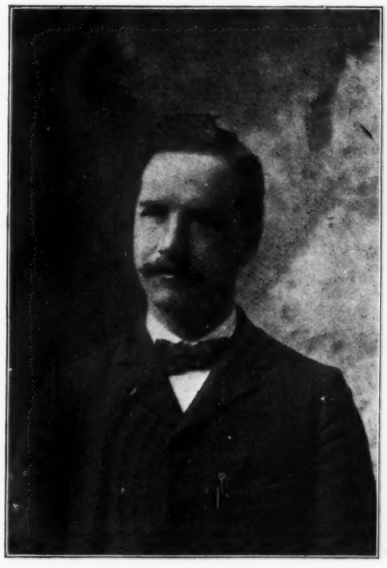
The water-closet trap, where there is no likelihood of its freezing, is located close up to the hopper. The water-closet seats are made from hard wood, open all around and supported on cast-iron legs.

I have previously stated the introduction of the first so-called sanitary water-closet into Chicago was the Shanks plunger closet. The next water-closet that appeared in this market was the wash-out. This closet was of an entirely

HALF TONE PLATE BY INTERNATIONAL ENG. CO., PHILADELPHIA.

JOHN S. DELEHANTY, OF ALBANY, N. Y.
Buyer for M. Delehanty's Son.

new principle to anything we had before, certainly it is the hopper idea, but superior in many respects. I think Myers & Sniffen, of New York, were the first to send them here about twenty-two years ago, and they were imported from either England or Scotland. From this time forward dated a new era in the annals of plumbing in Chicago, with the introduction of the flush rim hopper of the long and short pattern, of every shape and form; the siphon water-closet, so finely and scientifically adjusted to nature's laws; the pedestal washout closet, with its siphon cistern, polished brass pipes and hardwood seats, marble and tile floors; with all the variety of water-closets, the arrangement of parts is



HALF TONE PLATE BY INTERNATIONAL ENG. CO., PHILADELPHIA.

WM. A. MURRAY, OF NEW YORK.
Buyer for John A. Murray, 625-627 Sixth Avenue.

similar in many respects.

Every manufacturer of plumbing material of any note has his own combination, and of course his is the best. In all the variety of washout closets and hoppers there was not enough difference in the make-up of any one of them to say which is best. The washout water-closets were all more or less a copy of the original "Bostal washout." The system for all of those flush rim water-closets were of as much importance as the closet itself. Those cisterns were similar to the cistern of the old pan closet. The cisterns were made of wood, large and small according to their requirements and the ideas of the manufacturer. They were lined with copper and sheet-lead. For the flush-rim closet of the washout pattern the arrangement of the interior of the cistern differed in the ball and ball-cock and valve trimmings. The ball-cock was compression, and an improvement on the ground-key ball-cock. The greatest difference between the old make of cistern and new was in the flush-valve and the pipe to the water-closet. The flush-valve was three and four inches in diameter, having a one and one-half and one and one-fourth outlet pipe attached to the cistern at one end and the coupling of the flush-rim of closet at the other.

In the construction of the large valve and large flush pipe lay one of the secrets of sanitary plumbing. What I have said in reference to this cistern may be classified as applying to all closet cisterns of the flush-rim make. I may mention in passing that there were made cast-iron cisterns and sheet-brass cisterns. All of those cisterns were fitted up with compartments for fore and after wash, automatically arranged to operate by pressing on the seat. They could also be operated by chain and pull attached to a siphon valve.

The different kinds of water-closets and where they are used is the next topic. Office buildings in 1888 were very nearly all fitted up with long and short flush-rim earthenware hopper closets, automatically arranged by chain attachment to seat and cistern of the closet. In tenement buildings for the few years preceding 1888, the short earthenware hopper was used with cast-iron, lead, and earthenware trap above the floor. The chain and pull operated by hand, and seat connection siphon cistern were much used. Residence houses were supplied almost exclusively with washout closets and copper-lined and lead-lined cisterns with chain and pull attachments. Now the siphon jet is the thing.

Much dispute arose about 1880 amongst manufacturing plumbers and architects in regard to the quality of earthenware. It was strenuously held by some that the imported ware was far superior to the home made ware. It was maintained by others that the foreign ware will not crack half so readily as home production. I am well aware that some potteries do not turn out good crockery in this country, but what applies to this country is equally true as to others. I have used foreign ware and it has proved poor material and I have used home made ware and it has proved good. Our ware to-day is undoubtedly the best in the world.

We will now continue our search for changes in plumbing methods in the past thirty-five years. The next aspect of the case comes in the shape of sewer connections. The fitting up of soil and revent-pipes presents problems of the greatest importance to the plumber and the man who shall have to live near and use his work. The necessity for the ventilation of the soil-pipe is an outgrowth of the introduction of the new style of water-closet, though it has always been a necessity to ventilate sewer and soil-pipe. This is shown by facts gathered from experience, yet who will say he knew the necessity before the advent of sanitary fixtures?

It has come to be an established fact that a water-closet set on a line of soil-pipe without the pipe passing up and above the roof of the house and a revent-pipe from the crown of the water-closet trap is considered not a good job of plumbing. Be this as it may, it is a positive fact where there is more than one water-closet on a line of soil-pipe it must have atmosphere from some source and the purer the source the better. The quantity of water discharged, say six gallons, and it never ought to be less, to do the work effectually, forms a plug of water in its descent, creating a partial vacuum in the soil-pipe and removing the water from the trap. The ventilating and reventilating of water-closet pipes prevents siphonage of traps and has come to stay until some new method shall be discovered.

The soil-pipes that are put in buildings are cast iron. The revent-pipes are sometimes connected with the soil pipe above the highest fixture, and, once in a while, into a chimney flue.

There is a system of wrought-iron soil-pipe called the Durham system. The pipes are put together by thread. The best authorities on wrought-iron pipe say that the life of cast-iron is much longer than wrought-iron. The joints in cast-iron pipe can be made perfectly air and water-tight. If any change or alteration is to be made it can be much easier done with cast-iron than with wrought-iron pipe.

In connection with the subject of water-closets and soil-pipes the water-closet trap plays an important part. Traps are indispensable to sound plumbing, but especially the water-closet trap. The water-closet traps, as now made, are of cast and of drawn lead, of cast-iron and of earthenware. The lead traps are most commonly used. On all jobs where there is a pan closet or long hopper the lead trap is used entirely.

The first lead trap other than the hand and mould made traps from sheet-lead, was the cast-lead trap. I think it must be about thirty years since I first saw the cast-lead trap. The plumber had much fault to find with this trap, for two reasons. First, it was an innovation and violated the old accepted notion that it is well to let good enough alone. It would also deprive the plumber of his birthright to be the sole maker of traps. The plumber believed it was not only an intruder, but that it was not fit to be used, and he was right to a certain extent. These traps were brittle and hard, and a proper flange could not be turned over on them. There were also many a sand hole in these traps. I cannot say who was the inventor of this trap.

The next lead trap that appeared in Chicago, about thirty years ago, was the Dubois trap. I understand that a man of the name of Cunningham had a prior invention, but I never knew what became of it. This trap was drawn from molten lead, was round, smooth, even in bore and is very ductile.

The improvement in traps and their introduction into market has been of inestimable value to the public from a sanitary point of view. The dangers consequent upon the use of the old style hand and mould-made trap are reduced to a minimum now. In practice the plumber discovered the seam of the old-time hand and mould-made trap where the solder joined the two edges together would decay and break away and leave an open space.

Iron soil-pipe is used at the present in preference to lead. The method of joining the lead traps to the sanitary tees is by ferrule. There are several ferrules now in the market. One of these is a ring of iron forced or pressed inside of a lead pipe. The other is a ring of brass or iron forced or pressed on the outside of a lead pipe. The last is a ferrule of cast-brass, soldered to the end of trap or lead pipe and fastened into the soil-pipe T or bend with oakum and melted lead.

The methods of fitting up urinals has changed somewhat of late years. The urinals used in Chicago extensively for many years in public buildings and saloons was a lead-lined trough four feet and longer made triangular in shape, supplied with water through a perforated pipe running its whole length and operated by a self-acting Hooper cock with foot-treadle. Sometimes urinals were washed out by a common stop-cock and water let run a little all the time. Cast-iron and enameled iron troughs were also used and fitted up similar to the lead ones.

The improvements in urinals are like the improvements in water-closets. The aim of sanitarians for the last decade has been to reduce the dangers arising from foul places by substituting better material, non-porous vessels, and devising a better water washout. Earthenware has been in use for urinals for a long time and nothing has been found to give more universal satisfaction.

There are many different shaped urinals of earthenware. The flush rimmed lipped urinal and the others of the covered and flat shaped pattern are supplied through compression and self-acting cocks, and periodical automatic flushing tanks of various devices. The more recent improvements are marble stalls, they are principally fitted up in hotels and public buildings. The water supply is kept constantly trickling through brass pipes over the face of the marble backs, emptying into a marble gulley in the floor, which connects to the waste-pipe. The water-pipes of urinals are vented in the best jobs.

I will now note the changes in material and methods of fitting up bath-tubs, as compared to that of twenty-five years ago. There were no manufacturing establishments for the making of bath-tubs in Chicago until Louis Wolff commenced to make them years ago. Up to this time all our copper tubs were brought here from the east. The other bath-tubs that were used in Chicago were made by the plumbers, zinc and lead tubs.

There is not so much improvement in the shape of bath-tubs as there is in the way of fitting up and the material that they are made from. Had I to follow my feelings instead of my better judgment I would say the lead-lined wood bath-tub was the best ever used. It would last ages on ages where made out of the proper thickness of lead. The surface of the lead is a little too rough for a first-rate sanitary bath-tub. There are now the porcelain bath-tub and the cast-iron painted and the cast-iron porcelain.

The patent waste and overflows are only slight improvements on the bath waste and overflow the plumbers made forty-five years ago from a piece of lead pipe, brass valve seat, and cap fitting made to rest on the wood cap of the bath-tub. The present arrangement of fitting up bath-tubs is much more healthful and ornamental than formerly.

The old method of connecting the waste-pipes from bath-tub into the water-closet trap without a separate trap for the bath-tub is no longer considered by plumbers a good sanitary job. The plan now followed by the progressive plumber is to have a drum-trap for the bath-tub alone with the overflow of the bath and the waste from the bottom of the bath entering separately into this drum-trap to stop any circulation of foul air from the sides of waste or overflow pipes. The bath-tub trap has a separate vent-pipe carried through the roof of the building or into a vent-flue or other stand-pipe to prevent siphonage when the watercloset is used, and also to ventilate the drum-trap itself.

The wash-basins in use for many years in this city were known as common overflow basins. The wash-basins now are known as the patent rubber plug and the patent metal plug basin, the oval wash-basin, and basins of various designs with center outlets and back outlets. All of those basins can be fitted up with valve fixtures and many of them are.

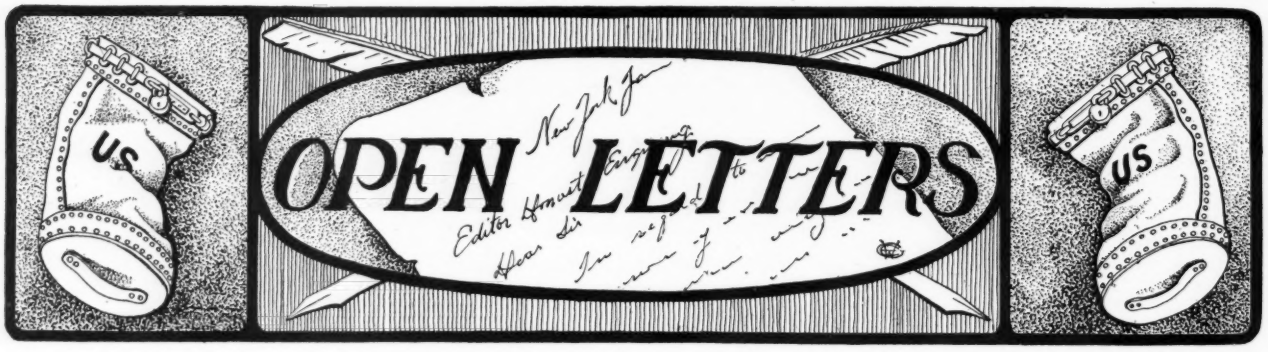
Cast-iron wash-basins and cast-iron enameled wash-basins and portable stands and washbasins combined of different shapes and sizes were much used for a great many years, especially in stores and offices.

There was also another class of goods much in vogue years ago, I refer to the combined earthenware slab and basin, which was very good but never became popular because they were so easily broken and could not be made well to fit in bath rooms and recesses.

The present method of fitting up wash-basins of the different patterns of earthenware is by setting a marble slab on the top of the basin. The marble slab is cut and fitted for the niche or place where it is to be set and instead of setting the basin, as formerly, into a wood slab to support it in place the basin is now fastened to the slab by brass clamps run in by lead.

The common overflow basins previously had the lead overflow connections made by putty. Now they are joined together with a rubber sleeve or connection. The marble slabs are now set on brackets and no woodwork around or about them.

Basin traps are now generally ventilated through the roof of the building or into another line of pipe. The basin cocks are much improved in style. The Fuller patent cocks, although invented many years since, it has only been within the past thirty years that they have been used to any great extent. For a great many years after the invention of the Fuller cock, which is named after the inventor, who lived in Brooklyn and had a small workshop and one or two men working for him, it was next to an impossibility to get any of them in Chicago. I remember when working for John Hughes (a master plumber), in the year 1862, hearing him say when he wanted any Fuller work he had to order it six months ahead. I think it was in the year 1873 the L. Wolff Manufacturing Company purchased the right to make Fuller work in Chicago. It was then, as the advertisement had it, "no more leaky cocks." The plumbers commenced to use them by the thousand. I remember taking out ground key work with the name of S. C. Smith & Co., Owens being the company and the successor, fifteen years after they had been put in, if the owner of the building's word was good for anything. Ground key brass work is the most durable and the best work ever invented, if made of the right kind of brass. There is no water hammer from their use and consequently not so hard on the pipes as Fuller work. Compression brass work has been used in Chicago for forty years and some makers' work has given great satisfaction.



Who Should Have This Contract?

To the Editor of Domestic Engineering: Sir—We enclose herewith an item which we would like to have you insert in your next issue of "Domestic Engineering." This was a recent decision concerning a hot water heating contract for which we had one competitor, and we feel confident that same will prove of great interest to the building and heating trade throughout the country. * * * After receiving this decision the builder informed us that he had allowed our competitors to again figure, with a result that they were a few dollars below us, although he entirely ignored us, and did not give us this opportunity. Of course you will see as well as we can tell you that this was a very easy matter after he had seen the decision, after they had seen our figures, etc., to come within our price, and the matter explains fully the unjust and unfair treatment that the trade has to contend with, especially the heating trade. It goes to show in this instance that if we had not brought the matter to a decision of this kind that our competitors would have been allowed to go ahead with the contract upon their original specifications and at their original price, which would have meant not large enough a boiler and not enough of radiation, and with all these deficiencies they certainly could not have heated the houses satisfactorily, and in turn this would certainly have brought discredit upon this method of heating. The enclosed copy is an exact duplicate of the letter sent to Mr. Moke by Mr. Adams, and, as before stated, we feel confident that it will prove of great interest to the building and heating trade. Yours very truly,

Wm. Groscup Co.

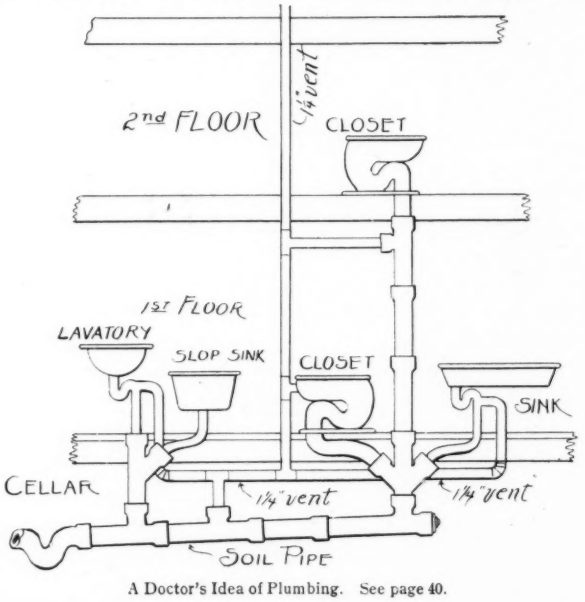
Baltimore, Sept. 18th, 1900.

STATEMENT OF THE CASE.

In a dispute between John S. Moke, builder, and the William Groscup Co., heating contractors, both of Baltimore, as to who was the lowest bidder on the heating of twenty-four houses on St. Paul street, between Thirtieth and Thirty-first streets, Baltimore, Md., the following decision was rendered by Henry Adams, consulting, mechanical and heating engineer, of Baltimore, who was formerly heating expert in the office of the supervising architect of the United States Treasury, viz.:

The William Groscup Co. tendered a bid to heat the above houses with a hot water system, direct and indirect radiation.

Adjoining these houses they had forty houses similar in construction, in which they had placed direct hot water heating systems, the same being erected from plans and details of a competent and experienced consulting engineer. In their bid on the twenty-four houses the William Groscup Co. were $300 higher in price than their competitor, the Chas. C. Heath Co., but in lieu of this had bid on a much larger size boiler and a larger amount of radiation, which they knew to be necessary from their practical experience with the heating systems they had installed in the adjoining houses. To decide and substantiate their claim to be legally the lowest responsible bidder, they had their consulting engineer prepare a set of plans of the buildings in dispute, for Henry Adams, C. E., to figure from, they agreeing to stand by his decision as to the correctness of their different claims. The builder, John S. Moke, also agreed to this, and the following decision being rendered, a representative of the William Groscup Co. called upon the said John S. Moke, builder, as to the award of a contract, and was informed that he (Mr. Moke) had allowed the Chas. C. Heath Co. to rebid for boilers of increased capacity over those specified in their first bid, that they had figured for the same amount of radiation as that proposed by the Groscup Co., and that their bid was a few dollars less on the twenty-four houses, although the William Groscup Co. was not allowed to rebid, thereby ignoring the decision in which all parties concerned agreed to accept.



A Doctor's Idea of Plumbing. See page 40.

DECISION.

Baltimore, Md., Sept. 10, 1900. Mr. John S. Moke, City. Dear Sir:—In the following I hand you my decision rela-

tive the bids received by you for heating your twenty-four houses on St. Paul street, this city, by hot water heating apparatuses.

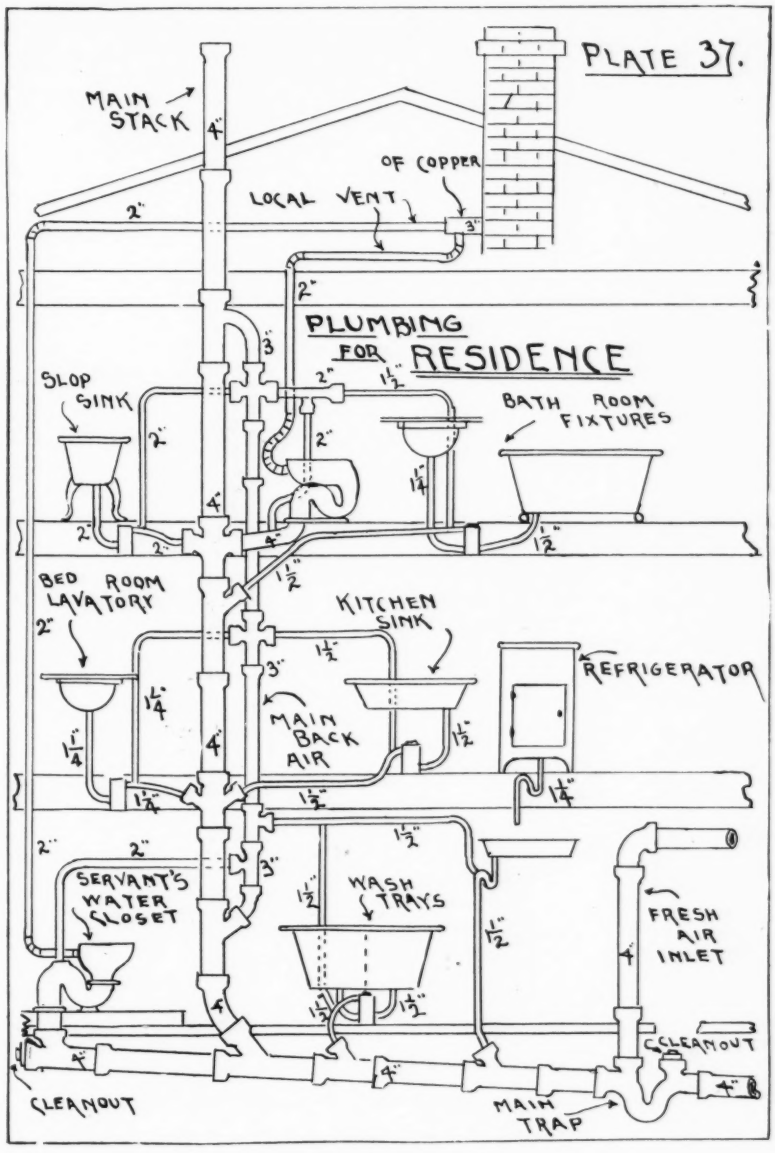
This opinion is strictly based upon the figures submitted to you in the original bids and specifications of Chas. C. Heath & Co. and the Groscup Co. The arrangements and conditions of the houses have not been taken into account, and hence made no calculation as to the question of radiation proposed being sufficient for proper heating.

Of the two specifications submitted, that of Chas. C. Heath & Co. is more in detail, inasmuch as the specific amounts of radiation are given for the various houses, whereas the Groscup Co. gives the total amount only. The bids submitted are as follows:

Chas. C. Heath & Co., $7,629, for which said bidders propose to furnish you twenty-four hot water heating boilers rated to have a capacity to supply 15,400 sq. ft. of direct radiating surface and a gross amount of 13,354 sq. ft. of heating surface distributed through the houses and consisting of direct and indirect radiation.

The Groscup Co., for $7,929, proposes to furnish you twenty-four hot water boilers, having a rated capacity to supply 17,200 sq. ft. direct radiation and heating surface distributed through the houses to the total amount of 13,914 sq. ft. In each case this is an excess over the amount proposed by the lower bid. The nominal difference in the bids is $300, and if this difference is only considered, the excess of the material proposed to be furnished by the higher bidders must be valued. I estimate the cost of the additonal 560 sq. ft. of radiation placed in the buildings, including additional valves, etc., as $131. The lowest valuation I place on the excess of boiler capacity of the Groscup Co. is $165, making a total of $296. To this difference another additon should be made, viz.: the cost of covering concealed risers with asbestos paper, which is contemplated by the specification of the Groscup Co., but not included in the bid of Chas. C. Heath & Co. This cost will practically more than cancel the difference in the bids, hence on even basis the bid of the Groscup Co. is practically the lower one.

Each bidder contemplates and guarantees to heat the houses during the coldest weather, but in considering such guarantees I prefer to base same upon the boiler and heating surface submitted, which is practically the only assurance that the guarantees will be easily carried out without trouble, changes, etc. After careful consideration of the two proposals, I must state that I consider that of the Groscup Co. a more preferable one, for the reasons that the proportions between capacities of the boilers and radiating surface and the grates of boilers are more satisfactory and give assurance that the guarantees proposed can be carried out in a more satisfactory manner than that of Chas. C. Heath & Co. Heath & Co. state in their specifications that boilers will have at least 20 per cent more capacity as the amount of radiation to be supplied by same, which, however, is not carried out by the detail specification at the end of their proposal. It is shown that in four houses the rated boilersupplied for the amount of radiation connected with the boilers, to assure economical firing. Chas. C. Heath & Co. propose to furnish 13,354 sq. ft. of radiation and, according to the specification submitted by them, the boilers to have a capacity of not less than 20 per cent in excess of said amounts, making a total required rating of boilers of 16,014 sq. ft., whereas the boilers as proposed have



Correct Residence Plumbing. See page 40.

er capacity is actually only 10 per cent in excess instead of 20 per cent. In other words, the margin of boilers is too close for the extreme conditions. Hot water boilers for this class of work should in no case have a rated capacity less than 30 per cent over and above the actual amount of radiating surface connected to same. The grate surface of the boilers submitted by Heath & Co. are also less in area than what ordinarily should be only a rated capacity of 15,400 sq. ft., which, in my opinion, is unsatisfactory, especially as part of the radiation will be indirect surface.

The Groscup Co. proposes 13,914 sq. ft. of radiation which, with 20 per cent additional, will be increased to 16,696 sq. ft., for which boilers having a rated capacity of 17,200 sq. ft. will be furnished, showing an excess over the 20 per cent and nearer the 30 per cent margin, which

should exist for pipe connections, etc. Considering the economical running of apparatus, I would state that the proportion of grates to heating surfaces is more favorable in the work submitted by the Groscup Co. to that submitted by Heath & Co. The grate surface submitted by the latter company for each of the different boilers is 2 sq. ft., 2.64 sq. ft., and 3.4 sq. ft., whereas the Groscup Co. boilers have 3.63 sq. ft. and 4.27 sq. ft. of grate surface, respectively, assuring an economy of fuel and no need of firing under extreme conditions.

In conclusion, I would state that I consider the proposal as made by the Groscup Co. a more preferable one. Yours very truly, (Signed) Henry Adams, Engineer.

A Doctor's Idea of Plumbing.

(See plates on page 38 and 39)

Cedar Falls, Ia.

To the Editor of "Domestic Engineering"

Sir—Inclosed you will find a sketch of a ventilating and plumbing job which is to be done in a doctor's office and residence. The sketch gives the doctor's own idea as to how the work should be done, and he will not have it any different. I have served nine years at the plumbing trade, and have worked in a good many towns in the state of Iowa and have never seen a job of this sort. I want to ask you if this job will ventilate as well as it would if the four-inch soil pipe was run through the roof and the one and a quarter inch pipe run straight up and branched into the soil pipe above the highest fixture. I made a wager of $25 that it will not work as well, and if the soil pipe gets stopped up, the doctor will never know the difference until the water backs up into the vent pipe. Please give me your idea on this job.

Reply.

The doctor's idea of good plumbing is very bad. No plumbing inspector in the world would pass a job of plumbing done in accordance with the doctor's suggestion. The soil pipe should by all means run up through and above the roof, and should be enlarged at its upper end. In order to show how completely wrong the doctor's idea of plumbing is, we publish herewith plate No. 37 from "Starbuck's Plumbing Charts," which shows in detail the method of venting different fixtures. Our subscriber's wager is well won.

An Artistic Plumbing Store.

(See plates on page 22 and 23)

The store of J. Frank Boyer, in Norristown, Pa., is one of the handsomest plumbing establishments in the United States. Mr. Boyer does plumbing, tin roofing, steam, hot water and hot air heating, and makes a specialty of gas fixtures. The store is 237 feet long by 20 feet wide, with three floors and a basement. It fronts on Egypt street, the main business thoroughfare of the city, and also on Lafayette street in the rear. The basement is used for storage and a workshop, and its floor is on a level with Lafayette street, from which wagons can be driven to or into the basement. The first floor is divided into a show room in front, 105 feet deep, running back to two offices, 12x15 feet respectively, and the balance is used for storage of all kinds of fittings and brass goods. The second floor is divided into two rooms, the front one 75x20 feet being used for gas fittings and plumbing supplies, and the rear one for unpacked stock. Mr. Boyer does not use the third floor at the present time, but it is available for his growing business.

Store of Evans, Seagraves & Co.

The illustration shows the store of Evans, Seagraves & Co., 541 Hamilton street, Allentown, Pa. A neat brass railing separates the exhibits from the main aisle of the store. The exhibit consists of a battery of closets and row of lavatories, slop sink and a series of baths. On the left-hand side is seen the exhibit of the heating department, consisting of steam and hot water heaters, radiators, etc., with a table for gas globes and lighting fixtures. The office in the rear is lighted by a skylight overhead, and the space in front is utilized for an exhibit of iron enamel lavatories.

Store of Evans, Seagraves & Co., Allentown, Pa.

An Interesting Show Room.

(See plate on page 25)

We illustrate herewith a show room of Wm. Welsh, located at Central avenue and Ann street, Cincinnati, O. The illustration shows the show room and office department. Mr. Welsh's business has rapidly grown and by hard work and business qualifications he has worked up a fine trade. Four years ago he engaged in manufacturing "Star" water filters, which he sells to the trade, a great many of which are in use in Cincinnati and elsewhere. Mr. Welsh has a branch at 3306 Warsaw avenue, Price Hill, a suburb of Cincinnati, where he does a nice business. He always keeps a competent plumber at the branch. At the present time he has a number of good contracts, including flat buildings in Price Hill and some residences in Clifton. In order to interest master plumbers in his filter, all who mention "Domestic Engineering" and send $1, either in stamps or currency, will be sent one of his No. 2 filters, nicely nickel plated and handsomely designed. The offer is limited to a short time. On application, he will be glad to send a catalogue of his different sized filters. He makes a specialty of furnishing stones for filters at a moderate cost, and when ordering stones the exact size with bore in center, should be given, or else sample sent. Mr. Walsh has just perfected a connection by which any small faucet filter can be elevated above the sink. Anybody can put these connections on, and it is very handy, as the faucet can be used independently of the filter. The connection will be sold for a while at the low price of $1.50. It is a new and novel idea and will be appreciated by plumbers who deal in filters.

Colorado Plumbers Meet.

Colorado Springs, Colo., Sept. 12.—The State Association of Master Plumbers of Colorado is holding an informal session in this city and a number of delegates are here from Denver, Pueblo, Cripple Creek, Victor and other points. The out-of-town men are here more as the guests of the local association than for the purpose of transacting business, but several matters of importance to the craft have been discussed and will be discussed today. The sessions are being held in the Midland block.

The officers of the state association are T. J. White, of Denver, president; E. R. Joyce, of Colorado Springs, vice president; Peter Menzie, of Denver, secretary, and R. McIver, of Denver, treasurer. The members of the executive committee are Chris Irving, of Denver; B. S. Cook, of Cheyenne; W. J. Donnelly, of Cripple Creek, and J. C. St. John, of Colorado Springs. The officers of the local association are E. R. Joyce, president; Frank Bumstead, secretary, and William Doyle, treasurer.

Conservative Humanity with Passing Notice of the Insurance Fraternity.

By F. Cortez Wilson, of Chicago.

"When I looked for good, then evil came unto me, and when I waited for light, then came darkness." Job, xxx: 26.

"We looked for peace, but no good came; and for a time of health, and behold trouble!" Jer. VIII: 4.

THESE remarks of Job and Jeremiah have led me to believe that their business was somewhat akin to the acetylene line. That man is naturally prone to prophesy failure and take counsel of his fears few will dispute, and it is especially true in regard to the enterprises of others, or in unfamiliar fields. If opposition could in some manner be limited to prognostications, the lives of discoverers might be happier. That human nature has not changed much in some respects during the past three centuries seems proved, as Copernicus deferred for eleven years the publication of a work on astronomy upon which he had been engaged for seventeen years, on account of the "popular outcry against himself, which, as a setter-forth of truths hitherto unknown to science, and an impugner of the rights of time-honored dogmatism, he must be prepared to endure," and it would have been better for Galileo personally if he had exercised the same wise discretion, however it might have been for the world at large. To reinforce this prejudice against innovations we have the attributes of jealousy and greed.

About the year 1622 one Dudley discovered that iron ore could be smelted with pit coal more cheaply than with charcoal, and built large iron works in which he carried on the manufacture of iron by his new process; the second year the "great Mayday flood" swept away the works and did much damage, whereat the chronicler says "the iron smelters of the district rejoiced exceedingly", and put in circulation all manner of disparaging reports about his iron. It was bad iron, not fit to be used; indeed, no iron except that which was smelted with wood charcoal could be good. It was a dangerous innovation and could only result in some great public calamity. All of which strongly reminds us of the position of our friends, some of the insurance men, in regard to acetylene. The iron masters also addressed a strong memorial against Dudley and his iron to King James asking for legislation, again reminding us of the frantic appeals made to city councils for ordinances to prevent the storage of calcium carbide within city limits. The making of good iron from pit coal, however, went cheerfully on "and a great store was made annually and sold unto divers men at £12 per ton," from which was made "all sorts of cast iron wares, better and cheaper than any yet made in these nations with charcoal iron."

Wherein there is encouragement for us.

Dudley's troubles did not end here. "His works were destroyed by a mob of rioters instigated by the charcoal iron masters; he was worried by law suits and eventually overwhelmed by debts, seized by his creditors, sent to London, where he was held a prisoner"—wherein there is no great encouragement for us. Charles I. took pity on the suffering inventor and on his earnest petition setting forth the great advantages to the nation by reason of his discovery, from which he had as yet derived no advantage, but only losses, persecution and suffering, and the king granted him a renewal of his patent.

Can we expect anything of this sort?

Benjamin Huntsman, discoverer of a method of making cast steel, a metal superior to blistered steel for many purposes, also much cheaper, worked his way to success through many years of experimenting. After his experiments were crowned with success, so far as his product was concerned, he naturally supposed that the Sheffield cutlery manufacturers would use the better and cheaper article, but "they obstinately refused to work a metal so much harder than that to which they had been accustomed, and he was obliged to seek a foreign market, and found it in France. The Sheffield cutlers became alarmed at the reputation which cast steel tools were acquiring at home as well as abroad, appointed a deputation to wait upon the member of parliament from York and requested him to use his influence with the government to prohibit the exportation of cast steel."

In 1776 a cast iron railway nailed to wooden sleepers was laid down at a colliery near Sheffield. The person who designed and constructed this railway was John Curr. He met the fate of men before their age; the laborers got up a riot, tore up the road and burnt the coal sheds, while Mr. Curr fled to the woods, where he remained for three days and nights to escape the fury of the populace. (Life of Geo. Stephenson, page 67.) The railway threatened canal interests, and when a canal promoter was congratulated upon the success of the scheme he said, "Yes, we shall do well enough if we can keep clear of these tram roads—there's mischief in them." (Ib., 68.)

Gasoline interests will do well enough if they can keep clear of acetylene.

Solomon de Caus was shut up in a madhouse in France because he was too persistent in "pressing upon influential people his plans for moving steam carriages on land as well as ships at sea." (Ib., 69.)

Don't be too persistent in pushing acetylene.

Some thirty years since a resident of this city invented a machine for nailing boxes together, which before then had been hand work of a class that could hardly be called skilled labor. Many men and boys were employed in the large factories devoted to the specialty of manufacturing boxes. The original projector of this machine worked a number of years in perfecting his invention. About seventeen years after the first box-nailer was built the machines had demonstrated their ability, and a large concern in this city decided to improve their facilities, be up-to-date and have box nailers that did not belong to a union or contribute anything towards the support of workmen who performed all their work in walking, nailers that would not go out on a strike. They accordingly bought and installed in their factory in this city in 1887 two of these machines. They were immediately waited upon by walking delegates from the nailers' union and informed that the machines must be taken out, as they were

"throwing poor workingmen out of their jobs"; the proprietors demurred and told their workmen that in order to hold their business it was necessary that they should have all of the latest and best machinery; that much of the business of making boxes was being done out of the city at the small towns in the lumber districts, where box nailers were only receiving about half the wages they were paying under the rules of the union. But these arguments did not prevail with the men; a strike was ordered, but the proprietors would not give in; they hired new men, many of whom were intimidated, others assaulted, and the "box factory war" lasted from Christmas until the following May. During this time the factory people found it necessary to maintain a hospital, and it contained from ten to fifteen patients all the time during the strike; three or four of the men died of their injuries and a number of strikers were killed. The company, however, won out, and at present are using in their factory forty-three box-nailing machines and employing about ten times as many men as at the time of the strike. Their courage and persistence retaining for our city an important manufacturing industry, which might otherwise have gone elsewhere, and other important industries requiring large quantities of boxes might have followed.

Conservative humanity is frequently blind to its own interests.

Samuel Smiles but echoes common experience. He says: "Every improver of tools had a long and difficult battle to fight for any improvement in their effective power was sure to touch the interests of some established craft."

Take the case of the saw. "Some ingenious person suggested that a saw be fixed to operate by wind or water power. It was tried and found effective, but it interfered with the job of the hand sawyer, and a long period elapsed before they would permit the new machinery to be set up and worked. The first sawmill in England was erected in 1663, but was abandoned in consequence of the hostility of the workmen. More than a century passed before a second was set up. In 1767 a mill was erected to operate by wind power, but the mill was no sooner erected than a mob assembled and razed it to the ground." "At a much more recent period new inventions have had to encounter serious rioting and machine-breaking fury. Kay of the fly-shuttle, Hargraves of the spinning-jenny, and Arkwright of the spinning-frame all had to fly from Lancashire, glad to escape with thier lives." Indeed, so jealous were the people and also the legislature of everything calculated to supersede man's labor that when the Sankey canal six miles long near Warington was authorized about 150 years ago, it was on the express condition that the boats plying on it should be drawn by men only. About twenty years ago the writer had a tool built for use in his factory for slitting sheet metal, wiring the edges for cutting circles, a good labor-saving tool in use today. A visitor of one of the workmen asked his friend "What is that thing for?" and was answered, "Oh, that is another contrivance for throwing poor men out of their jobs." It does seem that enough political economy should be taught in our common schools to disabuse the minds of the pupils of such false reasoning.

The present troubles in China appear to be the result of their conservatism, reinforced by their religion based practically upon the worship of their ancestors, causing them to regard all innovations as the work of the devil.

In 1797 Murdock publicly showed his system of lighting with gas made from coal, but it was not in common use in London until nineteen years afterwards.

Last month an American gentleman in London desired to show a simple acetylene gas generator. Under date of Aug. 2 he wrote us: "This place, however, being within the corporation limits of old London, I could not actually demonstrate the working qualities of the generator with carbide, as no acetylene is allowed within these limits." This although a public test of twenty-five generators continuing thirty days was held in London over two years ago under the auspices of a committee of scientists of the highest standing, who in their published report stated: "The exhibition at the Imperial Institute has clearly demonstrated that many types of acetylene gas apparatus can be so constructed as with ordinary precaution to be absolutely safe, and that lighting by acetylene need be no more fraught with danger than are any of the other forms of artificial lighting in general use."

When we remember that corporations having monopolies in the lighting business have existed in London ninety years, we have not far to seek to find an explanation of the situation.

Greed clogs the wheels of progress at times, and sad would be the situation were not avarice enlisted to push them forward.

It is only a little more than two years since a scientist in the pay of the insurance people in New York insisted that "Mercurial seals only should be used in acetylene generators." Also that "generators should be placed in very strong gas-tight rooms," two rules that were well designed to produce the accidents they were aimed to prevent. Who now uses a mercurial seal in acetylene apparatus or installs in a strong air-tight room?

Insurance interests are represented by very busy men having no time personally to devote to the study of new and intricate technical problems in which they are not especially interested, and it is natural that they should delegate to supposedly competent authorities investigations of this kind and base their action upon the reports submitted to them, and, having once thus become misinformed and in consequence prejudiced, are slow to change their opinion and take such action as is warranted by the facts

A part at least of the troubles of acetylene apparatus manufacturers grows out of the present tendency for combinations.

Formerly, each individual risk was written upon its merits, which came to the knowledge of the company through the inspection and report of its authorized agent, and the natural competition for business resulted in reasonable rates for the insured based upon the exposure, and this is now the case in the state of Texas, where anti-trust laws have broken up combines that in other parts of the country make the condition of things of which we complain possible

Liberty to act should be given the agent. If he is not competent and will not make himself so, he should give way to the man who is competent. An important industry should not be hampered in the interest of the incompetent or unreliable.

Verily, "nothing is so credulous as fear."—(J. T. Fields.)

At a late meeting it was stated that the companies had not been called upon to pay a loss growing out of the use of acetylene upon a single commercial risk during the past two years.

Apropos of the great danger of acetylene we will say that less than a year ago a small theatre in San Antonio, Texas, that was lighted with acetylene was burned down, with practically a total loss. The proprietor said that "the only thing saved was his gas machine and a half can of carbide standing near it from which the wooden jacket was burned." That generator is in use today.

Full details of the destruction of carbide works at Ottawa, Canada, have been published, as the fire was the subject of judicial investigation, and certainly nothing occurred that would warrant the extreme conservatism shown in the proposed rules for the storage of carbide.

The London committee already referred to in their report said: "As to licenses for storing carbide of calcium, we consider that local authorities need have no hesitation in granting such licenses for storage, provided it be shown to their satisfaction that the material is properly packed and that it is intended to store it in some dry, well-ventilated place." This report was signed by the entire committee, as follows: Major-General Sir Owen Tudor Burns, G. C. I. E., K. C. S. I. (chairman), Sir Frederick Bramwell, Bart., D. C. L., F. R. S., Prof. James Dewar, M. A., LL. D., F. R, S., Harry Jones, M. Inst., C. E., Prof. Vivian B. Lewes, Boverton Redwood, Prof. Sir W. C. Roberts-Austen, K. C. B., F. R. S., Prof. J. M. Thomson, LL. D., F. R. S., Sir Henry Trueman Wood, M. A. (Sec.)

In England today carbide cannot be carried in passenger trains.

Any attempt to set up a line of "cast iron" rules for governing the conduct of any business is a very difficult thing to accomplish without doing gross injustice to many of the parties interested, and to avoid it as much as possible should be left to the decision of the parties in interest, each individual case upon its merits.

A set of rules of necessity eliminates the "personal equation" which after all is the larger factor in problems of this sort.

The sage of Avon said, "Fear makes devils of cherubims," and we may safely say that fear of monetary loss makes carpers of otherwise reasonable men.

A writer upon "Invention as a Factor of National Wealth" in the July number of "Cassier's Magazine" is authority for the statement that while the remarkable increase in manufactures has been going on in the United States at an astonishing ratio during the past seventy years, that "The hours of labor have been reduced 25 per cent and the product per hand has increased 40 per cent and wages 48 per cent." Clearly proving that labor-saving inventions are as advantageous to the laboring class as to the well-to-do.

"In 1870 Great Britain produced nearly 59 per cent of the world's supply of iron; today the United States is the iron master of the world, a fact mainly due to American inventions, American product of iron and steel having increased 460 per cent in thirty years."

"The superintendent of one of the large steel works recently stated that by the adoption of the latest inventions they were able to produce a ton of steel with one-third of the manual labor that was required at another works built only twenty years ago."

Conservatism is all right and perhaps praiseworthy if reasonable. It is unreasonable conservatism based upon evils which only exist in the imagination, of which we complain; for instance, in many cases where, after a long voluminous correspondence covering every imaginable point, including insurance approval, we have succeeded in closing a sale, the generator was not installed because the old fogy owning the building occupied by our customer objected, although assured by agents of the insurance company that a permit for the installation would be written into the policy without any additional charge. In another case, where the generator was actually installed and used for a number of weeks, the owner of the building has filed his objections and insisted upon its removal, showing that we have not only to convince and satisfy our patrons and the insurers, but the public generally.

At this late date in all risks in the New England states covered by companies known as "New England Mutuals" acetylene gas lighting is tabooed entirely, although the management and control of those companies is largely in the hands of a very prominent individual who has assumed to advise the American public upon many questions of importance agitating the public mind, among them the question as to what shall be done with the Philippine Islands. We cannot help thinking that if he could manage to devote a portion of his valuable time to an investigation of the subject of acetylene lighting he would be contributing much more to the advancement of the interests of his fellow citizens, moreover save himself from getting very generally disliked, and eventually improve the income of the insurance companies he represents. "The mills of the gods grind slowly, but they grind exceeding fine."

Although most of the examples of public conservatism herein mentioned are in the field of industrial development, the annals of medicine, surgery, physics, education, law, politics, statecraft or what you will, show parallel experiences for pioneers. We do not encounter the actual physical resistance that has marred history but we meet the mental conditions which made those outbreaks possible. Nothing but straightforward methods of demonstration and education will change doubt to conviction and bring these conservatives over one more mole hill into the bright light of acetylene. It is no longer an experiment but proved night after night in thousands of places where men a little ahead of the procession have dared to adopt a good thing when it was brought to their doors.

Five years ago when we engaged in the manufacture of acetylene apparatus, we were fully cognizant of the experience of introducers of innovations in the past, but were of the opinion that in the United States, with her railroads, telegraphs, newspapers and public schools, it would be possible to make the facts known to the people in a much shorter time than had been possible at earlier periods. Are we to be mistaken?

The Pittsburg Plumbing Picnic.

Pittsburg, Pa.—(From a Staff Correspondent.)—The annual joint picnic of the jobbers and plumbers of Pittsburg was pulled off on Saturday, Sept. 22, without any serious results. In the prize contests, consisting of bowling, rowing, shooting, euchre, base ball, fat men's race and other sports, to say nothing of the great American game of "draw," the plumbers were victorious in all but two of the events.

The fat men's race was won by McGervey of the Kelly & Jones Company, although some of the spectators claim he had friends on the course to give his opponent, Otto Vorwerck, "the foot."

Purtill had all the luck with the cards and it is said took away a barrel of money mostly from the crack card sharps among the jobbers.

Brettell of the Bailey Farrell Mfg. Co. claims he would have won the boat race if they had not laid out the course so he had no water to row in.

The jobbers' team won the tug-of-war but the plumbers say they had the end of the rope anchored.

The plumbers won the shooting match but it is claimed Cawley shot the center of the target so full of holes that no one else could find any center to shoot at; it is further hinted that blank cartridges were supplied to the jobbers.

Joe Rice won the prize waltz with Miss Blythe as a partner.

The ball game was a run-away and was won by the plumbers who had previously promised the umpire a beating if he gave any decisions in favor of the jobbers—the score was 13 to 0—and the least said the better.

Felix, of the Pittsburg Supply Co., won the prize for telling the best story. Some people are rude enough to say the judges had respect for the age of the story.

The plumbers being first hands at "bowling" came off victorious in the bowling match. (Who said they had wires fastened to the pins?)

Baird and Hutchinson were not entered in any of the events but were at the dinner table long enough to win everything in the room.

After the arrival of the plumbers on the ground a spring was discovered the waters of which had a most peculiar taste. So many persons tackled it that about 4 o'clock the spring went dry—so did everybody else.

Jas. Young was in the shooting match, but he wasn't in it.

Corns and Bailey were to go together in the three-legged race but on account of previous experiences— Corns claimed one of his legs was longer than it really should have been.

For the benefit of Knapp, Reed, Purtill and the other children, a Punch and Judy show was provided.

Sweeney, who played first for the jobbers, is still at the park, at least he has not yet made his appearance at the office.

Bailey was ready to meet all comers in a wrestling bout but on account of his performance at Atlantic City could find no one who cared to risk a rib.

Altogether a very enjoyable time was spent. The weather was delightful and all the boys are looking forward to next year.

The list of the casualties has not yet been returned by Adjutant General Deely.

BUSY FITTING UP THEIR PREMISES.

Bucksport, Me.—The new business concern, H. F. Ames & Co., are hard at work fitting up their quarters in the N. T. Hill store. They will do general plumbing and steam fitting, tin, brass and sheet iron work and handle stoves, ranges, etc.

Items of Very General Interest.

Galveston Plumbers' Relief Fund.

In view of the possibility that Galveston sufferers in the plumbing business might be overlooked in the distribution of general relief funds, James B. Clow & Sons, of Chicago, upon receipt of authentic information from the death-stricken city, promptly mailed a check for $500. This house thought that a sum for the relief of suffering among master and journeymen plumbers would be more appropriate and do more good than a larger amount contributed to the general fund.

These investigations into the condition of the master plumbers of Galveston were begun immediately after the news of the storm reached this city. The first replies to inquiries came from May & Wainwright and Paul Shean, announcing the safety of themselves and families, but telling of death and destruction among others of the fraternity.

In these letters of inquiry, James B. Clow & Sons not only offered financial aid, but also any credits that might be required in assisting the surviving master plumbers to regain their commercial standing. A meeting of the survivors of the local association was called, and these letters read. Thomas J. Kirk, the secretary of the local, was instructed to write, accepting the proffered financial aid, and to give the details of the situation. This was done, and upon receipt of Mr. Kirk's letter, a check for $500 was mailed as a start to the plumbers' relief fund.

The employees of James B. Clow & Sons at once followed the example set by the house. A subscription paper was started, and over $100 was raised in the Chicago offices. Every one in the house contributed something, from the men who handle the pipe in the basement, to the cook and waiters in the restaurant on the top floor.

The success of this encouraged the house to extend the Chicago subscription list to the Newcomerstown pipe works and to the traveling salesmen, giving more than three hundred employees an opportunity to contribute. A check covering these various contributions will go forward today, and will swell the relief fund to a considerable amount.

One of the greatest sufferers of the storm is a master plumber, W. L. Ratisseau, who lost everything but his own life. Here is his letter received only a few days ago. It should arouse the plumbing supply trade of this country to sympathetic action:

"In answer to yours of the 13th inst. would state that it is only too true that I lost my wife and three children, and nearly all the rest of my family. There are forty-one in all of my family lost, my home and all other property swept away. At this sad hour of my misfortune, I sincerely thank you for your sympathy and words of kindness."

The relief fund is for the benefit of master and journeyman, to be applied to the needs of both, according to the best judgment of the association.

Contributions should be sent to Thomas J. Kirk, secretary Local Association of Master Plumbers, Galveston, Texas.

Gas Stove and Specialty Salesroom of Reineke-Wilson Co., Pittsburg.

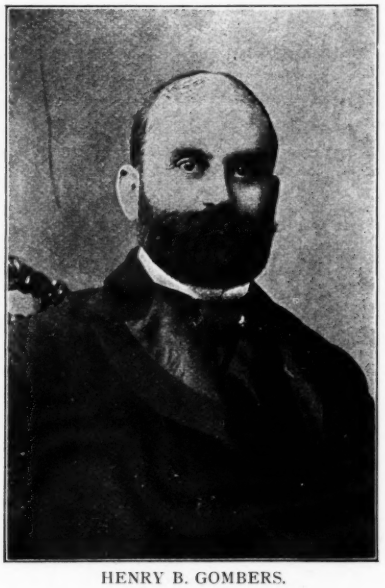
Employer and Employe.

Henry B. Gombers, secretary of the National Association of Master Steam and Hot Water Fitters, says:

During the past month the condition of the relations existing between employer and employe in our line of business has been quite different in various sections of the country.

In the West, the members of labor unions have been more or less irritating in their attitude towards their employers, and the result has been to make the latter (especially in Chicago) more positive in the stand they have taken to oppose the demands of the journeymen; and the steam fitting trade has suffered to an extent that must of necessity be felt more by the men than by the employers.

In the East, the condition has been somewhat easier for both master and man. No serious disturbance has occurred, but on the contrary conferences have been held by those directly interested, and (in New York city) working agreements have been made on a basis mutually agreeable and satisfactory.



HENRY B. GOMBERS.

Concessions have been promptly and willingly made in some instances by both sides, while disputed points have been thoroughly gone over and finally adjusted without friction. From a disinterested point of view, the writer is inclined to think that less trouble and annoyance is the lot of the master fitter who is a member of an association that treats with the journeymen fitters and helpers through the labor organizations of which they are members.

Agreements that are honestly made and conscientiously lived up to can certainly

Among the Dead at Galveston

The trade will extend its sympathy, its assistance and its prayers, to the mourners in the plumbing trade in Galveston.

The Dead

C. J. BROCKLEMAN.

Wife and three children of W. L. RATISSEAU.

T. C. TORR, wife and six children.

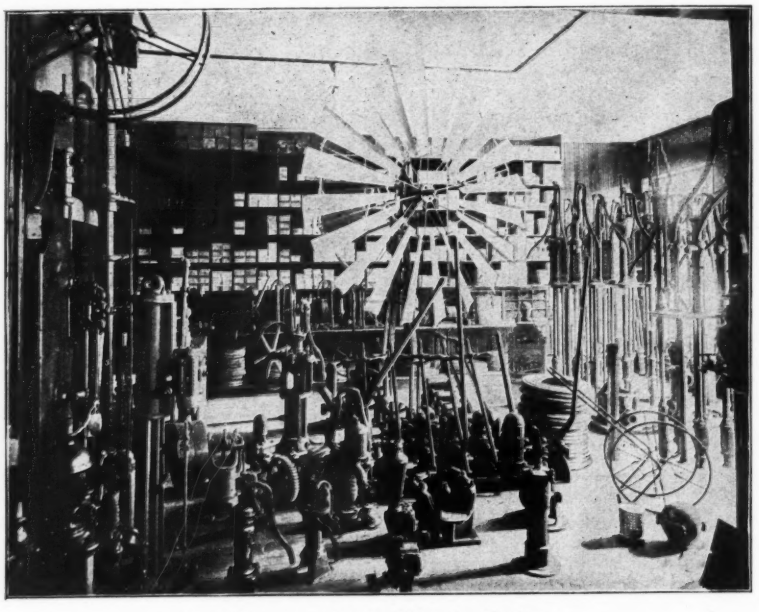
Daughter of C. K. WILCOX.

assure both the employer and employe that conditions will be undisturbed for at least the time covered by the term of the agreement; and, furthermore, that due notice of a desire for a change being given under the agreement several months before the expiration thereof, by either side, everybody concerned will have an opportunity to regulate their affairs accordingly.

One of the advantages of being a member of the Master Steam Fitters' Association is that when an agreement is being made with the journeymen's union, every member of the Masters' Association knows that he is being placed in a position to receive as good if not better terms than master steam fitters who are not members of the Masters' Association. It is a fact worthy of notice that no friction or serious differences have arisen in the East for some years past, and it is to be regretted that the steam fitting trade (among others) has been annoyed to the extent that it has in the West. Let us hope that those who are entitled to better treatment by the labor unions will receive it, and that those who are in no sense worthy to be called master steam fitters will not be given any consideration as such, but rather be put back where they belong in the ranks of the journeymen steam fitters or steam fitters' helpers.

Men who pose as master steam fitters while still members of a labor organization ought to see their way clear to withdraw from their former affiliation and thus be in a position to be considered full fledged masters.

D. F. Durkin, Jr., of Philadelphia, is setting one of Cooper's Reno closets in a large house on Tasker street, that city.—Adv.



Pump Salesroom: Reineke-Wilson Co., Pittsburg.

Complete List of Paris Awards to Heating Exhibitors.

The following is a complete list of all the awards to exhibitors in the Paris exposition in the department of heating and ventilation:

GRAND PRIX.

Grouvelle & Arquembourg, France.
American Radiator Co., United States.

GOLD MEDALS.

Drouet Georgs, France.
Model Heating Co., United States.
Sulzer Freres, Switzerland.
Societe Anonyme des Usines du Pied-Selle, France.
Utzschneider & Co., France.
Faure Henri, France.
Bollinder J. Cg., Sweden.
Leroy & Co., France.
Lacoste Edmond, Belgium.
Muller E. & Co., France.
Bourdon Ch., France.
Michigan Stove Works, United States.
Warren Webster & Co., United States.
Musgrave & Co., England.
Bernier V., France.
Loebintz Jules, France.
Pommier & Delaporte, France.
Societe Anonyme des Etablissements Alles Freres, France.
Boyle & Son, Ltd., England.
Hartley & Sugden, Ltd., England.
Lumby Son & Wood, Ltd., England.
Chibout Daniel, France.
Martin Arthur, France.
Fouche Fred, France.
Astorgis Ch., France.
Boeringer A., France.
Bohain Leon, France.
Chaboche Edm., France.
Castoul Aine & Co., France.
Delafolie Bastide, France.
Egrot & Grange, France.
Godillot A. G., France.
Societe Anonyme des hauts fourneaux et fonderies de Brousseval, France.
Roth Carl, Germany.
Escoyez Louis, Belgium.
Clark & Co., Geo. M., United States.
International Heater Co., United States.
Magee Furnace Co., United States.
Mott J. L. Iron Works, United States.
Blackman Ventilating Co., England.
McClary Mfg. Co., England.
Lakos Louis, Hungary.
Societe de la Fabrique d'Armes de Husvarna, Sweden.

SILVER MEDALS.

Farcot Emm., France.
Reveilhac Pierre, France.
Leclercq & Co., France.
Dorian G., France.
Becht & Dyserienck, Holland.
Andre & Co., France.
Societe Generale de Fumivorite, France.
Ducouroy, France.
Gandillot Rene, France.
Estate of P. D. Deckwith, United States.
Powers Regulating Co., United States.
Crane Co., United States.
Lunkenheimer & Co., United States.
Maugin Victor, France.
Herendeen Mfg. Co., United States.
Societe du Thermophore, Germany.
Mathian C., France.
Caillette & Narcon, France.
Digard Sebastian, France.
Odelin Joseph, France.
Cuau Aine, France.
Aerret Michel, France.
Smet Auguste de, France.
Societe du Poele Besson, France.
Fabrique de Foyers Economiques d'Hildesheim, Germany.
Quintaux & Fils, France.
Cortland Howe Ventilating Stove Co., United States.
Hart & Crouse Co., United States.
Smith & Anthony Co., United States.
Adshead & Anthony, England.
Cartland & Son Ltd., England.
Record Foundry & Machine Co., England.
Auttie Henri, Monace.
Hiorth, Norway.
Compagnie de l'Usine Metallique de Saint Petersbourg, Russia.
Griswold Mfg. Co., United States.
Hjorth & Co., Sweden.
Ruef J., Switzerland.

BRONZE MEDALS.

Fabre J. & Co., France.
Societe d'Eclairage de Chauffage et de Force Motrico par l'Alcohol, France.
Hebert Parfait, France.
Courtine, France.
Martin Fils & Co., France.
Societe Anonyme des Anciens Etablissements Parvillee Freres & Co., France.

Societe des Fourneaux a Petrole a Petrole a Flamme Bleue, France.
Spuhl H., Switzerland.
Rolland d'Ochancourt Alfred, France.
Denniel & Co., France.
Nanquette J., France.
Rolet A. & E. Fontaine, France.
Fabrique Neerlandaise de Bronzes, Holland.
Fabrique Comesul, Roumania.
Camus Henri & Fils, France.
Societe du Chauffage Hygienique, France.
Lequeux-Muston & Co., France.
Wery Eug., France.
Prost, France.
Compagnie National des Radiateurs, France.
Fouilloud & Co., France.
Grove, Germany.
Sommerhuber, Austria.
Viktorin, Austria.
Ashton Valve Co., United States.
Darler A. C. Mfg. Co., United States.
Rufus R. Wade, Chief of the District (Massachusetts) Police, United States.
New York School Board, United States.
Phillips & Clark Stove Co., United States.
Tuttle & Bailey Mfg. Co., United States.
Butterworth & Co., England.
Evered & Co. Ltd., England.
Gasorcoal Stove Co. Ltd., England.
Star Iron Co., England.
Chaplean & Son, England.
Hicks, England.
Dell 'Orto, Italy.
Lacolle Alexandre, France.
Association Ouvriere "Les Fumistes de Paris," France.
Aubert Louis, France.
Chapuis Fr., France.
Cordier, France.
Jeannard H., France.
Societe des Tuyaux Chameroy, France.
Bernot Freres, France.
Compagnie Generale des Fourneaux Modernes, France.
Daval, France.
Delarnelle, France.
Schuppmann, Germany.
Abram Cox Stove Co., United States.
Kieley & Mueller, United States.
Mackay William, United States.
Societe de Basaite et Ceramique, Roumania.
Matthews & Yates, England.
Wagner Mfg. Co., United States.
Kugler, Hungary.

HONORABLE MENTIONS.

Astorgis Louis, France.
Baudelot & Henry, France.
Bourdin Ch., France.
Dalla Torre, France.
Dinz Felix, France.
Gautreau Henri, France.
Potain, France.
Bugnod & Garnier, France.
Sarriot, France.
Maxani, France.
Meaille, France.
Renaut G., France.
Societe Anonyme des Fontaines a Gaz, France.
Vallette J., France.
Weis A., France.
Butzbach, France.
Gratien, France.
Lipps, Austria.
Cassart de Feruchmont, Belgium.
Montreal Gas Compagny, England.
Farkas Ch., Hungary.
Weisz & Co., Hungary.
Kallina J., Hungary.
Ferreira & Co., Portugal.
Judson A. Goodrich Co., United States.
Griswold Mfg. Co., United States.

Gas Fixture Salesroom: Reineke-Wilson Co., Pittsburg.

O.K.

CLOSETS.

No iron trimmings on inside of tank that will discolor closet bowl.

Closet will rough in 12 inches.

Iron pipe size, brass supply pipe.

Lined with Four Pound Sheet Lead or Heavy Copper.

The O. K. Manufacturing Co.

ANN ARBOR, MICH.

New York Blower Co., United States.
W. B. Scaife & Sons, United States.
Thomas Robert Stevenson & Co., United States.
Baumann, France.
Legrand Vernhes & Co., France.
Renou Aug., France.
Sommaire L., France.
Thouilly Antoine, France.
Gauquelin, France.
Tharaud Lacar, France.
Hardsmith, Austria.
Linnekogel & Sons, Norway.
Moreira J. A., Portugal.
Gaiser, Germany.
Societe Arabia, Russia.
Philadelphia Hardware & Malleable Works, United States.
Rochester Radiator Co., United States.
Troy Nickel Works, United States.
Drion, France.
Launay, France.
Vallad, France.
Valiat, France.
Toucho, France.
Colombel H., France.
Giglio Santo, France.
Bruckenhaus & Lorenz, Germany.
Conrad, Germany.
Fabrique de Fourneaux Refractaires de Meissen, Germany.
Forge Royale Wurtembourgeoise, Germany.
Geisendoerfer, Germany.
Haurleiter & Eisenbeis, Germany.
Siemens, Germany.
Kamelsky, Austria.
Desvignes de Malapert, France.
Lampre-Degieux, France.
Lathoud Aine, France.
Comite Special de Salzburg, Austria.
Beck & Co., Belgium.
Lefevre Henri, France.
Hoffmann, Luxemburg.
Mahoney Mfg. Co., United States.

The awarding of the prizes was a very interesting event. Our correspondent writes:

On Saturday the Exposition exhibitors will receive the fruits of their labors. The superior jury has finished its work, under the presidency of M. Millerand, minister of commerce, and the final list of awards attributed to exhibitors is made up. The distribution of these will take place on Saturday at three o'clock in the afternoon. The ceremony will take place in the Salle des Fetes, on the Champ de Mars, and the president of the republic, witn the members of his Cabinet, as well as the commissioners-general from all nations, will be present. The official procession will traverse the Salle des Fetes and will take its position on the "tribune d'honneur" facing the grand staircase. Thirteen thousand invitations have been issued. A cantata entitled "Patria," especially composed for the occasion by Leborne, will be executed by an orchestra and chorus. President Loubet and Minister Millerand will address the exhibitors, after which the list of those receiving the "grand prix" will be read by Commissioner-General Picard.

Giovanni Mulberry on "Teddy" Rosevell

How "Teddy" rode on the wings of fame. Verbatim speech of an Italian gentleman flirting with Americanisms.

Good-a morn Gendeman an Leddeis.

Me like-a to speak-a to you, bout-a one-a big-a man, his-a name Rosevell, some-a paper funny speak-a call-a him Teddy. Long-a time-a go, nuncha body no-a disa man-a much-a, his-a Fard got-a plent-a mon, an' buy-a one street-a in disa Citti. He make-a one big-a Hosp, an' he got-a one Ferri to Brook. Biam by five-a six-a years-a long-a time, Tammana Hall-a come-a too fresh-a, an' take-a too much-a peanuts-a from Italia man, too much-a Veg from-a Commish man and too much-a mon from-a every body, an' he got-a kick-a out. Den Publicana man got-a May, disa May call-a himself, Mist Strong-a Tea, cause him no drink-a much-a Beer-a an' him got-a big-a Fott like Elephant.

Disa May give-a Teddy one-a job, same like-a you call-a one-a big-a Hill in-a Africk, Spion Copa, an' him make-a much-a trubla for Police-a man every night.

Den came-a lexcha time, an' Mist Kinelli he get-a lext King and Mist Han get-a lext Queen.

Mist Kinelli give-a Teddy one-a job, same like you call-a help-a Seck, in-a Neve Yard, den-a Teddy, much a like-a disa job-a much-a, an' him tell-a Mist Kinelli, you make-a big war in-a Chigamorg, me want-a plent-a fight, cause me like-a one-a nudder job, an-a Mist Kinelli he make-a big-a fight, no too much-a. Den-a Teddy, he give-a up disa job-a Seck-a, an' make-a one Reg call-a Ruff Ride-a, an' him-a self, he kill-a one-a man, name Balm-a Beef, same-a time disa man run-a de way. Den-a come lech-a time again, an' Teddy he come-a back, an' show-a him-a self on-a Broodaway, an' all-a peple get-a much excite, an' callem out tree-a cheers for-a Teddy! Hurrah for-a Rosevell! here come-a our next-a Gov! an' Teddy make-a much-a big-a laugh on his-a face, all-a peple see his-a toote.

Well; plent-a boodel man give-a lot-a mon for lech, an' Mist Rosevell, come-a Gov. Teddy say, me make-a good-a Gov, me dig-a canal plent-a deep-a, me give-a all Italia man plent-a work, an' me lock-a up all-a man what steal-a canal. You look Mist Rosevell do all-a dis? Nuncha believe. Yes, he let-a one-a wom get-a kill with-a chair, cause him-a tink too many wom in-a disa counteri.

Now come-a some plent-a mans what make-a Trust-a Ice for saloon-a man, an' Teddy want lock-a up saloon-a man and leave-a Trust-a Ice man go home, cause-a Trust-a Ice man be Publicana man. Teddy got-a plenta-a books in his-a head. No to-day, yesterday, Teddy say, me no want-a be first-a horse. Nudder man what you call-a "Tommy," him-a say, Teddy you one-a horse like-a you call-a one-a Skate. You nuncha one like-a Kinelli Mack, you can no win-a disa race, biam bye, four years, all-a right. Well Teddy him-a go to slow-a Town to de Convench an' take-a him Ruff Ride-a hat, an Mist Han give-a him the Vice, and Teddy him no make kick-a, like one good-a boy. Me saluta you,

Giovanni Mulberry.
Per L. J. Euvrard.

SCHNEIDER'S INSTANTANEOUS

Bath Water Heater

Highest efficiency and cheapest prices.

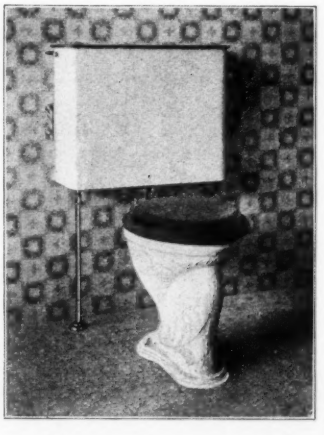
"Ann Arbor" Hygienic Steel Tank

Low down combination, lined with copper or lead. Enameled in any color.

Write for prices.

Schneider Closet and Heater Co.

ANN ARBOR, MICH.



Mr. Tierney is An Orator.

Providence, R. I.—(From a Staff Correspondent.)—When the Almighty, in His world-making flourish, dropped the sands about this region He did so with a purpose. No great achievement reaches a successful culmination without a purpose, though the same may not be readily apparent to man's dull senses. Not that the name Providence bears with it a potentiality sufficient to place it in the category of a saint's rest or endow it with a heavenly characteristic too supernatural for the abode of ordinary mortals. Nay; far be it from such a blessed conception.

However, here is an oasis amid the confines of the smallest state in the Union which might profitably be called by a name awe inspiring enough to express its greatness. In fact, the state is practically the city, and vice versa, but more emphatically the city is the state. Let Providence drop into the bowels of the earth, as did the historic Atlantis into the bosom of the deep, and the state of Rhode Island would surely be an infinitesimal speck among the great states of this country, which are hermetically bound by the ties of blood, commerce and liberty.

But the most important fact in connection with this city to the master plumbers of the land lies in its being the headquarters whence is promulgated the edicts of that greatest of organizations, from the pens of President Tierney and Secretary Conroy.

Mr. Tierney never has been considered an orator in any sense of the word. His star, however, was in the ascendancy as a marshaler of men, a royal good fellow and a man who knew how to do the right thing at the right time. A man of a conservative mind, ready intellect and dynamic force, backed by a splendid physique, was bound to be heard from. The last time I saw him I made the remark that possibly before the year was up he would discover that a slight particle of Demosthenes' blood flowed through his veins, and in case it did a surprise would be in store for those who had come to look upon him simply as a genial gentleman.

The dye is cast! President Tierney will be considered from a different standpoint when he mounts the rostrum at the next annual convention. In place of the pebbles which rattled in the mouth of the greatest of all orators and aided most effectively in making his well modulated voice outride the storms of the sea, let the mind wander to a mouthful of solder pellets. Imagine, if you will, the rear of a palatial plumbing store, with a high board fence, where pussy delighted to sing her most melodious ditties. The fence is there, but alack for pussy! One sonorous strain from a man of genial mien but ponderous physique, who stood with a well-thumbed Columbian orator in his left hand, while his right cut the air from the bottom of the eaves trough, sounded her knell. No cats are now to be found in the neighborhood, but thanks to persistence our president has become an orator.

Secretary Conroy is popular and a hustler. He is always on time, and you can bank your last year's discarded socks all is well when he is around. The neighbors for two blocks each side of his store set their watches by him every morning. His punctuality, geniality and conviviality are synonymous with his every-day life. He performs his official duties in the same animated spirit with which he enters the daily routine of his business. His eye is ever on the alert to enhance the social end of the home organization. When the time rolls around for their famous clam-bake, J. C. is always there and has surely oiled all the tracks leading to and around the whole affair. The ladies all say so, anyway, and the way they turn out to help celebrate is a fair criterion to judge of the success attendant upon these festivities.

E. C.

Plumbing Superiority Will Always Out

Don't you know that those who employ plumbers are bound to find out where the finest and best work is to be had?

They will certainly find you if you do first-class, conscientious work, and if you use the celebrated Blatchford Solder, Lead Pipe, Sheet Lead, Lead Traps, Bends and Ferrules.

—"A Tower of Strength."

E. W. BLATCHFORD & CO.

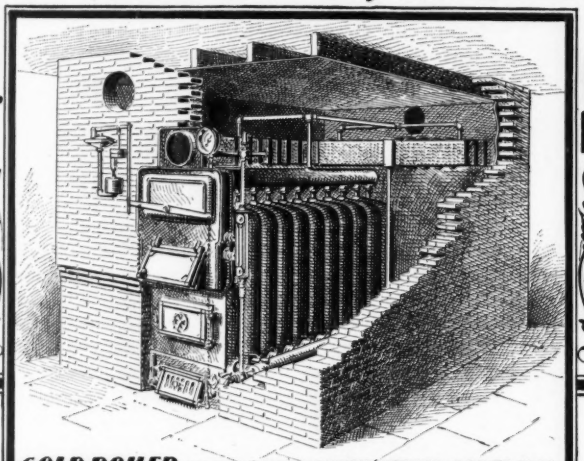
Clinton and Fulton Sts., Chicago

THE H.B. SMITH CO.

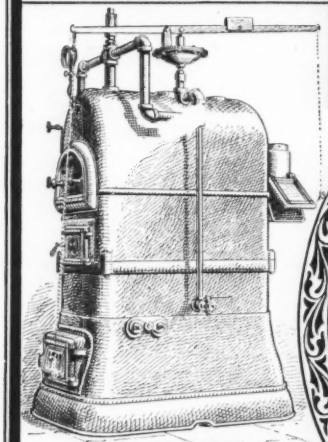
WESTFIELD, MASS.

EUROPEAN AGENT.
AUG. EGGERS
BREMEN AND NEW YORK CITY

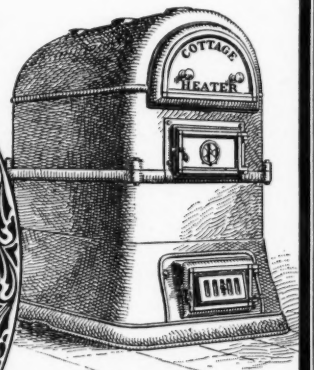
PACIFIC COAST AGENTS.
HOLBROOK, MERRILL & STETSON, SAN FRANCISCO, CAL.



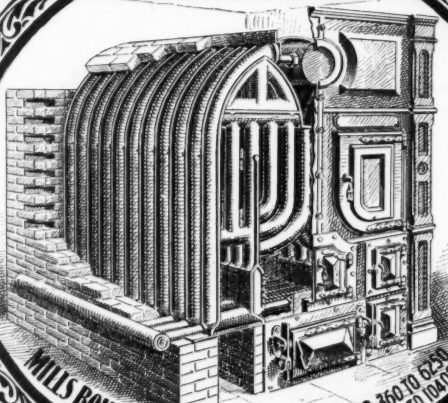
GOLD BOILER. SQ. FEET STEAM RADIATION SUPPLIED 240 TO 1300.



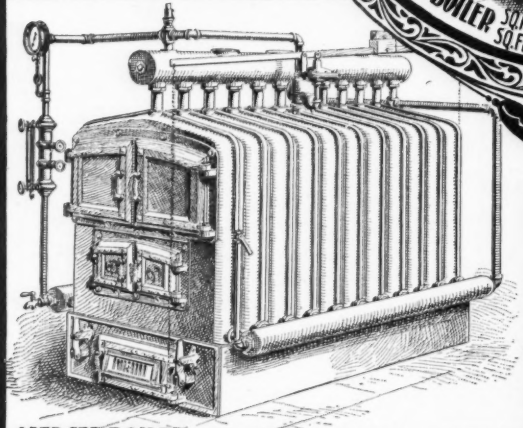
COTTAGE BOILER
SQ. FEET STEAM RADIATION SUPPLIED 100 TO 650.



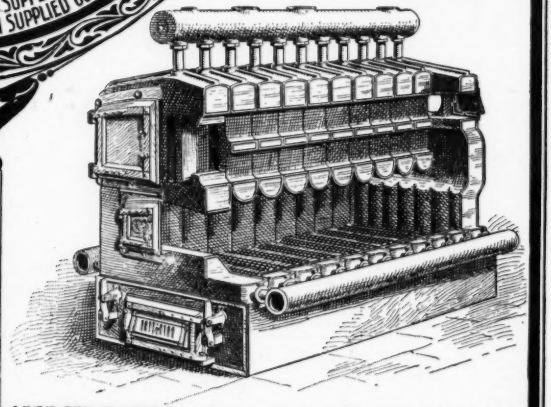
COTTAGE BOILER.
SQ. FEET WATER RADIATION SUPPLIED 150 TO 1000.



MILLS BOILER. SQ. FEET STEAM RADIATION SUPPLIED 360 TO 6250.
SQ. FEET WATER RADIATION SUPPLIED 600 TO 10400.



MERCER BOILER. SQ. FEET STEAM RADIATION SUPPLIED 300 TO 3500.



MERCER BOILER. SQ. FEET WATER RADIATION SUPPLIED 450 TO 6900.

AMERICAN SPUD

WESTERN AGENTS. WESTERN BRASS MFG. CO, ST. LOUIS, MO.

SALESROOMS

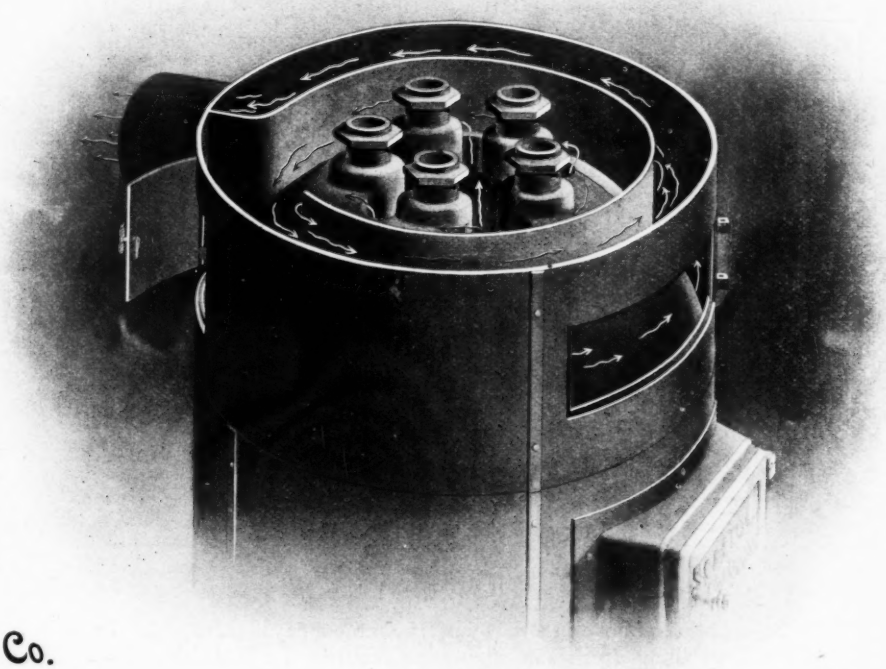
133 CENTRE STREET, NEW YORK CITY. 510 ARCH STREET, PHILADELPHIA, PA.

Heating and Ventilating.

By the Fan System as applied in the Jackson School in St. Louis.

LATER day ideas on the subject of ventilation have found expression in the widespread adoption of the fan system, with its forced circulation of air for heating and ventilating large buildings of all descriptions. The fallacy of heating by direct radiation and depending for ventilation upon chimney action or the low pressure due to differences of temperature of interior and exterior air is coming to be more and more clearly seen, with the result that the fan is now resorted to as the most approved mode of performing those two functions so essential to the modern structure. In practice the forms which this system takes are various; the governing factors are the number, size and arrangement of the different rooms and the amount of air necessary to heat and ventilate. In some buildings the amount of air required to heat is more than ample for ventilating, and here increased economy may be gained by returning a portion of the air to the fan for reheating. In such buildings, however, as schoolhouses, where the ratio of the cubic contents to the number of occupants is small, especial attention must be given to ensure an abundant fresh air supply. Hygienists tell us that the proportion of carbonic acid should not be allowed to exceed double that in pure country air, i. e., means should be taken to provide against the presence

"Capitol Heaters"



The adjoining cut represents the Capitol Mascot Heater with top header removed. Note the new arrangement of baffle plates, which increases considerably the length of fire travel.

A copy of our circular fully describing the "Capitol Mascot (Improved)" will be mailed you on application.

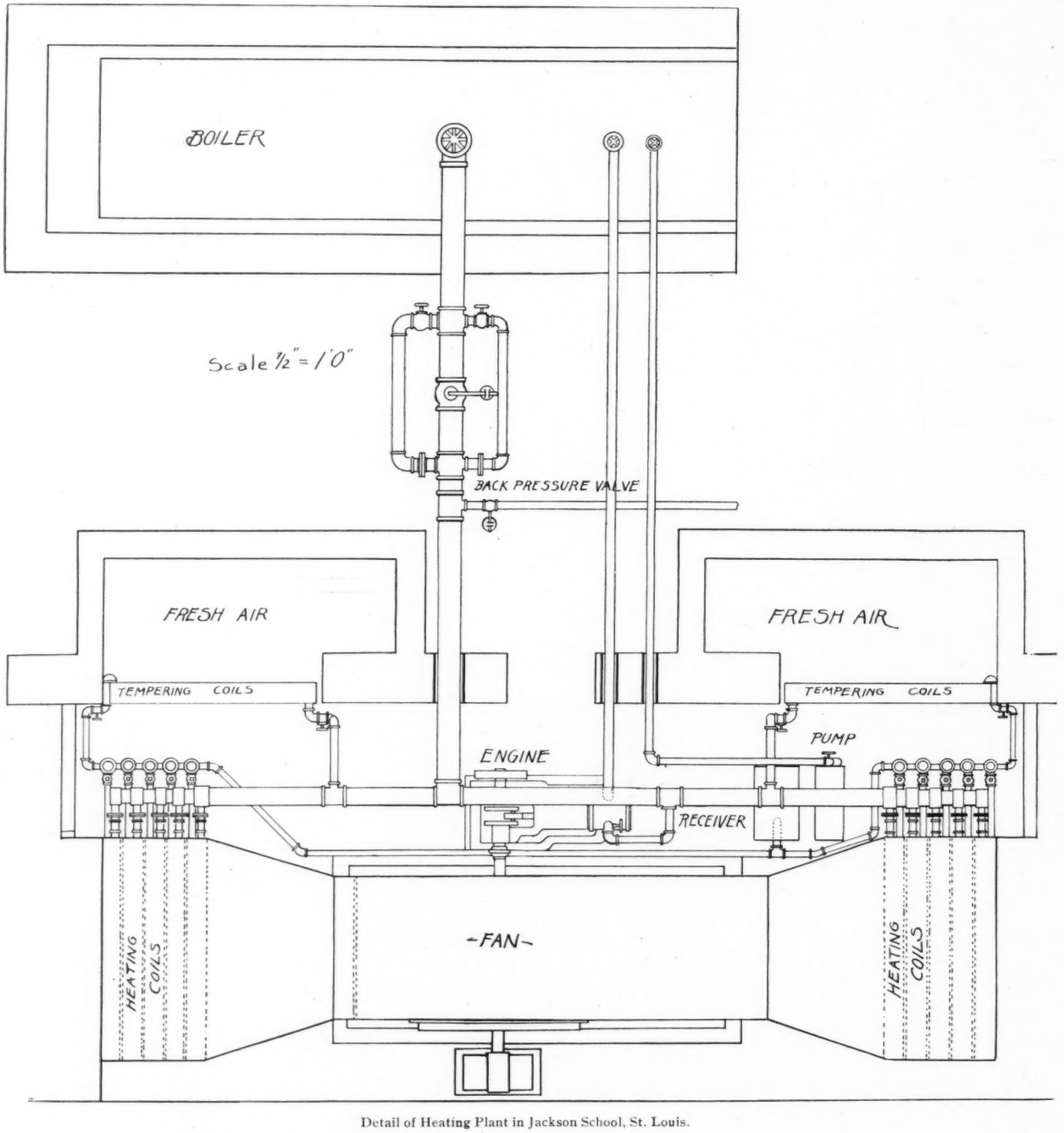
United States Heater Co.

NEW YORK...DETROIT...CHICAGO

Philadelphia, 48 N. Seventh St. Boston, 35 Congress St.

of more than eight parts of carbonic acid in ten thousand parts of air by volume. Under ordinary circumstances a supply of thirty cubic feet of fresh air to a room per minute per individual is considered ample to prevent undue vitiation. To attain to this standard the fan, with its forced circulation, is the one adequate device. Hence, it is eminently fitting that in schools, of all buildings, the fan room independent of the temperature, which itself may be under automatic control.

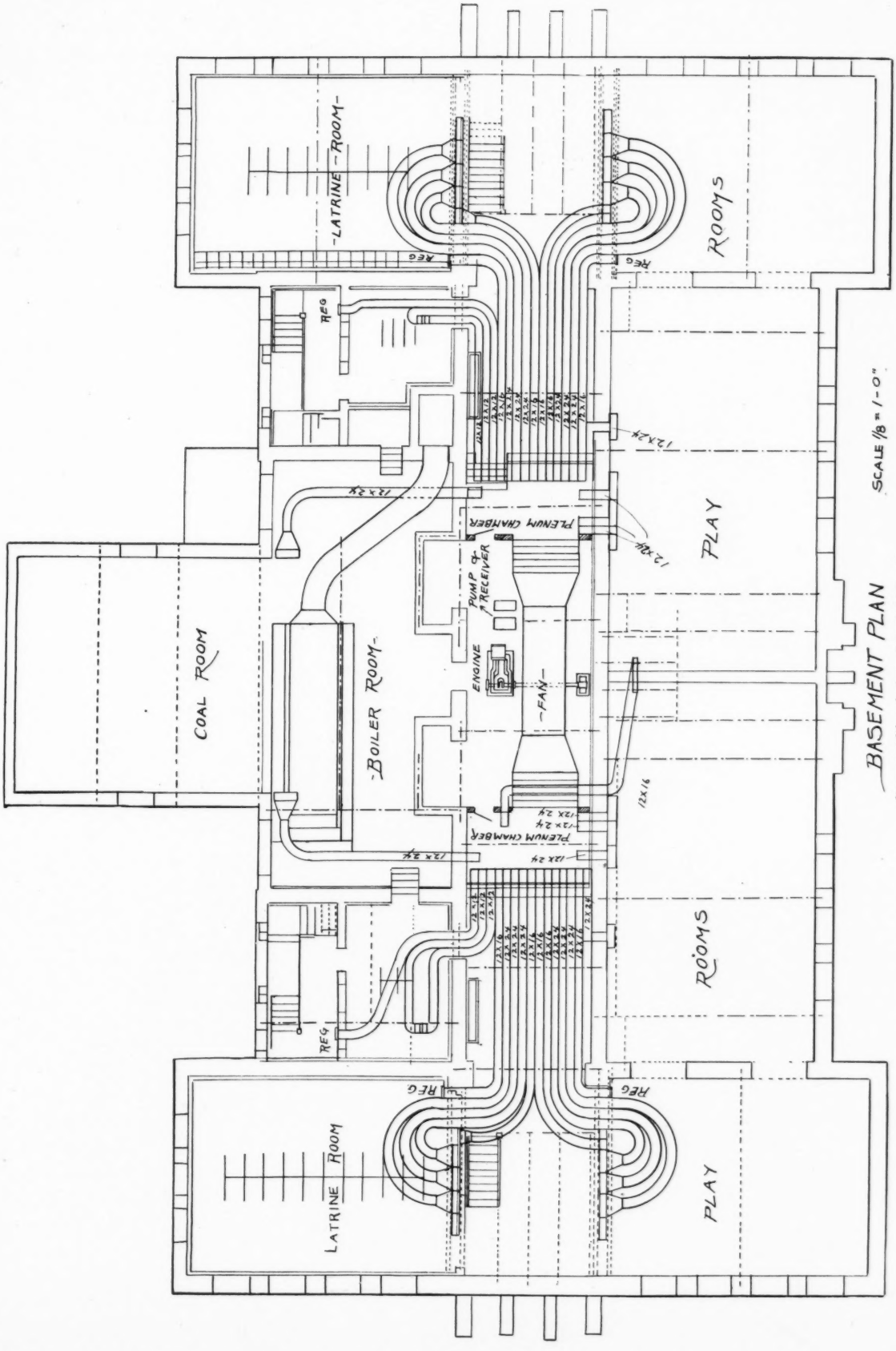
The Jackson School is one of a large number of St. Louis educational institutions for which heating and ventilating plants have been built by the Buffalo Forge Company, of Buffalo, N. Y., and installed by the Cullen and Stock Heating and Ventilating Company, of St. Louis,



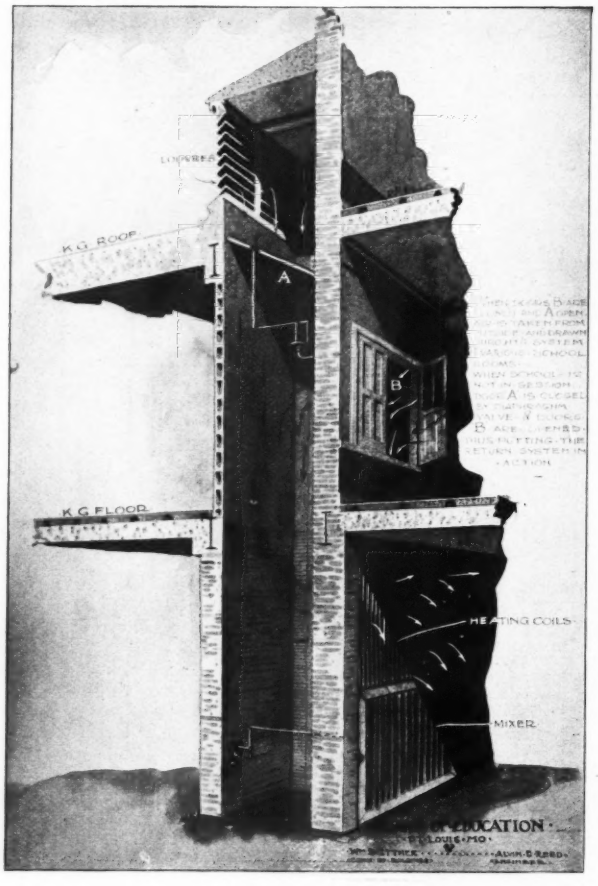
Detail of Heating Plant in Jackson School, St. Louis.

should be installed almost in every instance now-a-days to give that unfailing fresh air supply so requisite for healthful conditions. As constructed by the Buffalo Forge Company, Heating and Ventilating Engineers, of Buffalo, N. Y., this system delivers a constant supply of air to each

Mo. This building is situated at the corner of Hogan and Madison streets, St. Louis, and contains eighteen class rooms, a kindergarten, principal's office and three recitation rooms. The heating and ventilating plant, built according to the plans and specifications of Wm. B. Ittner,



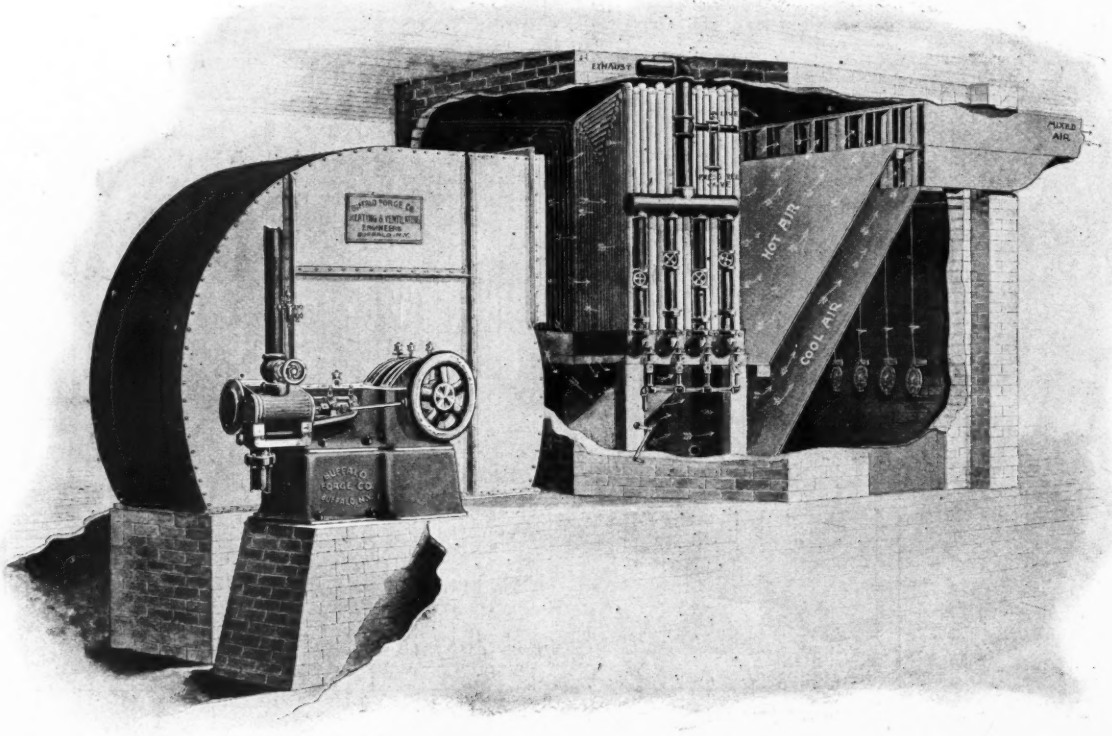
Basement Plan, Jackson School, St. Louis.



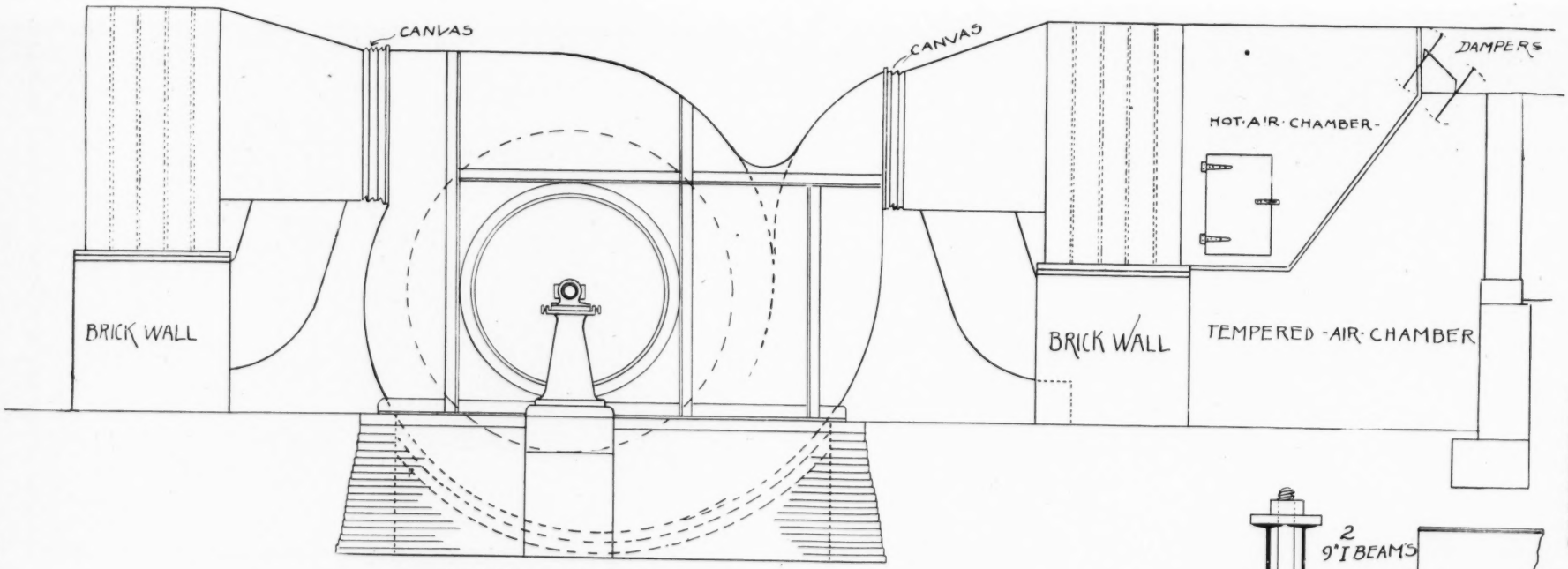
Heating Detail, Jackson School, St. Louis.

Commissioner of School Buildings, and Alvin D. Reed, Chief Engineer, Building Department, St. Louis Board of Education, may be described as a "Low Pressure Steam Hot Blast" or "Plenum" system, and comprises essentially a fan, fan engine, heaters, tempering coils, hot air or plenum chambers, horizontal air ducts, and vertical fresh air and vent flues, together with the incident dampers and regulating apparatus. The plant was designed to heat each room to a temperature of seventy degrees, and the halls to sixty-five degrees Fahrenheit, this with the temperature outside at zero and a gage boiler pressure of twelve pounds. The air supply is based upon an allowance of thirty cubic feet of fresh air per minute to each pupil and 10,000 cubic feet additional per minute for the principal's office and recitation rooms, the corridors and basement. Assuming sixty pupils to each of the eighteen class rooms and one hundred in the Kindergarten, the total delivered air supply per minute amounts to 45,400 cubic feet.

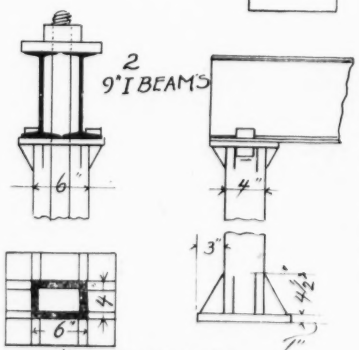
The appended half tone shows the general style of the fan and heater employed for handling this volume of air. In this particular case, however, the fan, instead of having a single outlet, as shown, was built for double top horizontal discharge, blowing to the right and left through two independent heaters. To secure the most convenient and economical distribution, the fan, heater and plenum chambers are placed centrally in the basement, where is likewise situated the play rooms, boiler room and coal room. The fresh, pure air from out of doors finds entrance to the fan room through two air shafts in the center of the building, each about 11 by 3½ feet in section, passing then over a tempering coil, although in mild weather the air is diverted under this coil. From the fan, the air is discharged partly through the main heater coils and partly beneath them through the tempered air by-passes into the double



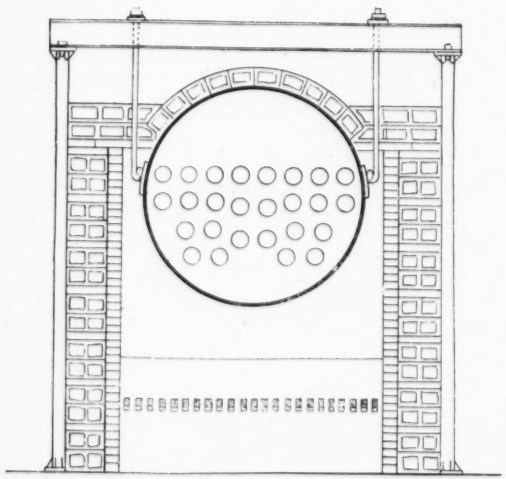
Construction of Fan.



ELEVATION OF FAN

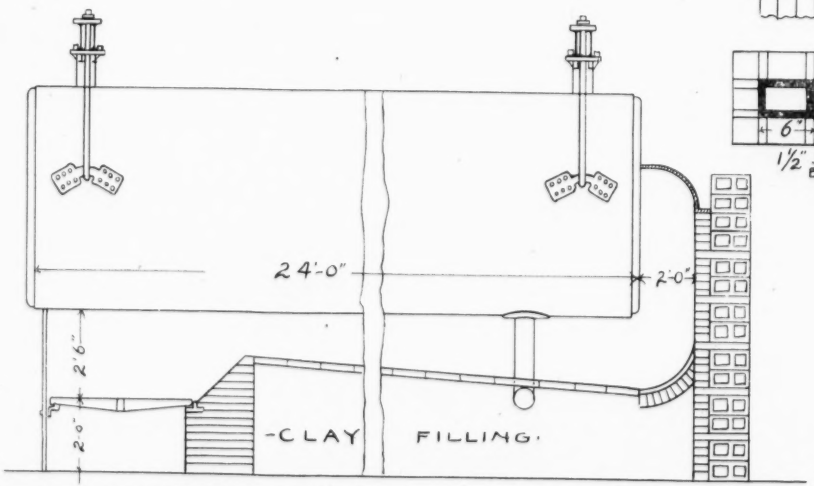


1½" SCALE DRAWING
BOILER SUPPORTS



TRANSVERSE SECTION OF BOILER

Scale ½" = 1'-0"

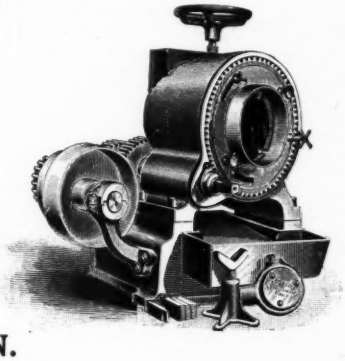


LONGITUDINAL ELEVATION & SECTION OF BOILER

Details of Heating Plant, Jackson School, St. Louis.

Twelve-inch pipe cut off and threaded with ease by one man and a

Forbes Patent Die Stock



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13 GARDEN STREET, BRIDGEPORT, CONN.

plenum chambers. Here dampers are placed, controlling the air supply entering the various ducts. For this school the fan is a 170 inch Buffalo steel-plate, three-quarter housing fan of special construction. That is, the fan is arranged for double top horizontal discharge, blowing in opposite directions through two independent heaters into two separate plenum chambers. In other words, the systems for the two sides of the building are separate, having only the fans and engines in common. The blast wheel of the fan is built up of curved steel-plate blades rivetted to three spiders, and has two conical side plates to afford additional rigidity. Each spider is built of wrought iron tees cast into a heavy hub. The wheel itself is 10 feet in diameter and 5 feet wide and is carried on a 4½ inch shaft 11 feet in length. One end of this shaft is supported by a Buffalo adjustable outboard bearing, while directly connected to the other end is the motive power, a Buffalo 18x12 horizontal center crank Class "B" engine, running at 150 revolutions per minute. The fan, it should be mentioned, is built as an exhauster, that is, has a single inlet 6 feet 7¼ inches in diameter located on the side opposite the engine. Connection between the fan outlets and heater castings is made by a short width of heavy canvass.

The heaters are made up of five abutting heating coil sections, each comprising four rows of one inch steam piping leading from and returning to a cast iron base with partitions and connections for live and condensed steam. The tempering coils heretofore referred to are composed each of one such section. The length of the heater proper in the direction of the flow of air is 4 feet 2¾ inches, its width 7 feet 4 inches, and height 7 feet 9 inches. The top of the heater case, which is of thin steel plate, stands 12 feet 3½ inches above the floor line, allowing ample room beneath the heater coils for the tempered air by-pass. The boiler, in this case one of the horizontal tubular boiler type, 72 inches in diameter and 24 feet long, is located in the forward part of the basement. The main steam pipe, after passing through a 6-inch Kieley low pressure reducing valve, and running back to the fan room branches to feed the heaters. An independent steam pipe from the boiler supplies the fan engine, the exhaust of which is discharged into the steam pipe feeding the heaters. Each section of the heating and tempering coils has a 3-inch steam supply and two 1½-inch drips. The return steam and condensation passes to a receiver and thence is pumped back into the boiler, thus completing the cycle.

Just beyond the heaters on each side are the plenum chambers. These are 7 feet long by 14 wide, and amount to an extension and widening of the heater cases. An inclined partition, running upwards from near the base of the heater coils, separate the hot air chamber above from the tempered air chamber below, substantially as indicated in the half tone cut. The various independent ducts, thirty-nine for whole school, which feed the different rooms, open into the plenum chambers at the top, connecting both with the hot air and with the tempered air compartments. At this point in each duct is a mixing damper, which is arranged to open or close entirely, or to take and maintain

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CLEVELAND, OHIO, U. S. A.
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Messrs. Schuchardt & Schutte, Berlin, Vienna, Brussels, Cologne, St. Petersburg and Stockholm

any intermediate position depending upon the proportion of hot or tempered air required in the room to which the flue leads. These dampers are so constructed that opening the connection to the hot air chamber closes that to the tempered air, and vice versa; that is, the flow of air in the ducts is constant, independent of the temperature. This ensures a proper air supply under all conditions. To ensure perfect automatic regulation, each damper has attached to it a pneumatic diaphragm valve, which in turn is controlled by an adjustable thermostat. The latter in each case has the usual thermometer and dial for indicating the average temperature of the room. By-pass damper doors under the tempering coils are likewise under automatic control. Such is the perfection of this system that the temperature does not vary more than one degree either way from the temperature at which the thermostat is set.

From the plenum chambers, the various ducts, most of which are 12 by 24 inches in section, are carried along the basement ceiling to the vertical air flues, which open into the respective air spaces throughout the building through registers placed well above the head level of the occupants. Exit for the air after it has cooled and fallen gradually over the occupants is provided for by means of ventilating faces opening near the floor line into vent flues, which latter lead up to the attic through galvanized iron connections. The slight excess of pressure existing in the rooms due to the forcing of the fan creates the necessary flow through the vent flues, which is also aided by the natural draft or chimney action of the latter. The excess of pressure referred to is advantageous also in that it prevents leaks or drafts of cold air from without.

This plant is characteristic of numerous installations by the Buffalo Forge Company, though, of course, in different situations the type and arrangement of the fan, heater, and ducts vary greatly. The heating and ventilating plant here described, with its air supply constantly ample in volume and at proper temperatures automatically controlled, may be taken as typical of the latest and best practice in the art of heating and ventilating.

Heating and Ventilating a Home.

How a Heating Contractor should Talk to a Consumer about to buy a heating apparatus.

THE modern house is a well heated and well-ventilated house, for everybody now knows that the health and comfort of the family depends more upon pure, warm air than upon any other thing about the house. We have also learned that it costs no more to heat and ventilate a house properly than it did the old fashioned way, with overheated or burnt air. The cost of the ventilating system is very small and will be saved in the fuel bill almost every year.

A thorough system can be installed at a very small cost by putting a four-inch vent pipe into the base-board in the coldest part of each room, and as far away from the heat register as possible. This draws off the cold and bad air and draws the warm over to take its place and obviates largely the difficulty sometimes found on windy days of not being able to heat certain rooms exposed to the wind.

The wall pipes conducting the hot air to the second and third floors, should be placed in the partitions, as close to the furnace as possible, avoiding all sharp angles; also avoiding their being carried by flat runs under the floors, as much as possible. These pipes should be carefully and thoroughly wrapped with asbestos paper, run straight to the registers, these being placed in the walls without frames. The shoes at the bottom, to which the round pipes connect, should be angled, so that the heat will come into the pipes from the bottom.

The return pipe from the hall should be run along the cellar ceiling until it reaches a point opposite the furnace, when it should drop straight down by the side of the furnace and be connected into the bottom of the pit, a shoe or shield being placed in the pit to prevent the rush of cold air from the outside backing up through the return pipe. It may also be run under the cellar floor in a duct, the same as for fresh air.

While a combination of hot water and warm air is the ideal method of heating, a warm air furnace with proper ventilation gives most excellent results.

The Furnace.

In selecting a furnace the first thing to be taken into consideration is to get a furnace that is amply large to do the work without crowding the fire.

In considering this, it is not entirely the size of the fire pot. The radiating surface above the fire pot has its proportionate value in connection with the fire pot. A small fire pot with a very large radiating surface above will give better results both as to the efficiency of the furnace and the economy of the fuel than a large fire pot with a small radiating surface.

The furnace itself should be placed as near the center of the building as possible. Underneath the furnace should be dug a pit not less than 20 inches in depth, bricked up with one good course of brick, the diameter of this pit corresponding exactly with the diameter and form of the base of the furnace.

In the center of this pit should be built a brick pier as a support for the center of the furnace to rest upon, inasmuch as the center of the furnace itself carries the bulk of the weight above.

From this pit and level with it, should be built the cold air duct, to either the north or the west window, or that side subjected to the coldest wind, the depth of which, like the furnace pit, should be 20 inches. The width should vary from 20 to 26 inches, according to the size of the house.

The square contents of this pit should be two-thirds the size of the square contents of the furnace pipes, taken off from the dome of the furnace. For instance, as a 10-inch pipe has a capacity of 78 square inches; an eight-inch pipe has a capacity of 50 square inches. Supposing then, five 10-inch and four 8-inch pipes be taken from the top of the furnace, this would give us a total of 590 square inches. The size of the cold air duct in this case should be approximately 400 square inches. This would give you a duct 20x20 inches.

The best duct is made by bricking the sides and arching over the top. Over this should be thrown a couple of inches of sand and then the cement floor of the cellar can be laid over this. Right under the window should be left an opening the full size of the duct. From this should be built a wooden riser up to and including the window, and just above the window should be put a slide, which can be drawn in and out so as to regulate the amount of air taken from the outside. In the place where the window sash is generally placed, put a screen the full size of the window. This will keep out insects and vermin, and at the same time, will not obstruct the flow of air.

In setting up the furnace, care should be taken that every piece fits smoothly; that all the joints are well packed with asbestos cement and that furnace sets plumb and level.

The outside jacket of the furnace should be made of galvanized iron, lined up on the inside with a good quality of bright tin, leaving an air space of about half-inch between.

The smoke pipe from the furnace to the chimney should not be lighter than No. 24 steel or galvanized iron, the full size of the collar in the furnace.

The opening in the chimney should have a good, heavy iron thimble, into which the smoke pipe should fit firmly. This enables the smoke pipe to be easily taken out without disturbing the chimney, when it becomes necessary to clean same.

The first and second joint of smoke pipe, after leaving the furnace, should be a tee joint, on which the check damper should be placed, and to which the chain should be connected running up to the first floor, so that the furnace can be regulated without going downstairs every time it is desired to change the dampers.

From the cone top of the furnace, the hot air pipes should be taken, run at as heavy an angle as the depth of the cellar will allow.

Round three-piece elbows should be used wherever possible, avoiding square elbows always.

All registers on the first floor should have frames, so as to leave an air space between where the tin register box fits in and exposed woodwork. Should, for any reason, the woodwork touch the piping at any point, at least three thicknesses of asbestos paper should be fastened on, and over this should be placed a strip of bright tin, tightly fitted, to prevent its coming off.

All registers should be located in the floor or in the side wall, just as close to the furnace as possible, which gives a better rise to the pipes, less friction in carrying the air and delivers the air hotter in the rooms.

Combination Hot Water and Hot Air.

For the combination, the same specifications as above would be applicable to the furnace pot of the combination heater.

The boiler of the combination should be hung in the dome of the furnace, entirely free from and above the coal, so as to get its heat from the flames of the consuming gas, as well as the radiated heat.

The first section of this boiler should be made in the shape of a horse-shoe, the open part of which should be directly opposite the door, so as to allow the boiler to hang as close to the coal as possible and still not interfere with putting in the fuel. This boiler is supported in the dome of the furnace by the flow and return pipe connections. From the top of the boiler, or coil, the flow pipe for the hot water pipes is taken, rising not less than one inch in every ten feet, branches being taken off wherever necessary, opposite the location of the different radiators, and wherever thirty or more feet of radiation are taken off, a reducing fitting should be placed.

From each radiator should be taken also, the return pipe of equal size, with the flow pipe increasing in size back to the boiler, as the piping from each thirty feet of radiation or more is added.

From the return pipe of some radiator on the second floor, (usually the bathroom) just below the elbow, is placed a tee with a $\frac{3}{4}$-inch opening, from which is taken the pipe leading up to the expansion tank. The sizes of the openings in the hot water radiators, should be for from 40 square feet and under, 1 inch; above 40 feet, not exceeding 72 square feet, $1\frac{1}{4}$ inch; and above 72 square feet, $1\frac{1}{2}$ inch.

The area of different main pipes must, of course, be equal to the area of all its branches. The following tables will perhaps serve as a guide:

1-inch main will supply two $\frac{3}{4}$-inch branches.

$1\frac{1}{4}$-inch main will supply two 1-inch branches.

$1\frac{1}{2}$-inch main will supply two $1\frac{1}{4}$-inch branches.

2-inch main will supply two $1\frac{1}{2}$-inch branches.

$2\frac{1}{2}$-inch main will supply two $1\frac{1}{2}$-inch and one $1\frac{1}{4}$-inch, or one 2-inch and one $1\frac{1}{4}$-inch.

3-inch main will supply one $2\frac{1}{2}$-inch and one 2-inch, or two 2-inch and one $1\frac{1}{2}$-inch.

By following this table and using ordinary judgment, there should be no trouble whatever in determining the proper size of the piping for an ordinary combination plant.

In many respects the combination is preferable over either the straight hot water or the straight hot air; over the hot air for the reason that it softens the temperature of the very hot air coming from the furnace down to a mild temperature. It is preferable over the hot water, because with it there is a constant stream of fresh air coming in from outside, thoroughly warmed as it passes by the furnace. A constant circulation of air is obtained, securing thorough ventilation of the rooms, which cannot be done with a straight hot water plant, without the use of "indirects," which are expensive. At the same time, it takes the rooms which are farthest away from the furnace, heating them with

hot water by means of circulation, giving economy of fuel as well as far better satisfaction in results.

Hot Water.

In the hot water heating, the first essential thing is to get ample radiation. Architects and fitters vary in the way of estimating this. Perhaps, however, as safe a rule as can be laid down for general use, is: Where the house is not more than ordinarily exposed, one square foot of heating surface to every thirty or thirty-five cubic feet of air to be heated, adding about fifty per cent for rooms which want to be especially warm, such as bathroom, also adding fifty per cent for indirect radiation, when used.

The open tank system is ordinarily used, because of its absolute safety. The pressure in such a system, in case the fire gets too hot so as to form steam, finds a vent through the open expansion tank.

In small houses, where less than 500 feet of radiation is used, a round fire pot and boiler is preferable to the rectangular. Where more than this is used, the rectangular fire pot and boiler has a preference.

The first essential thing, of course, in this as well as in any other heating plant, is to have a boiler that is thoroughly capable of doing the work, and for this, perhaps, the return flue is preferable; that is, the heat from the combustion chamber is carried to the rear of the boiler, then up and through the openings between the sections, then drawn to the front and back to thee rear, allowing for great fire-travel through the water sections, the water absorbing the heat from the smoke and gas as they pass. With such a boiler as this, the smoke pipe should not get hot, the water absorbing the heat before it reaches the smoke pipe.

From the top of the boiler is taken the main flow pipe, having an elevation of one inch in every ten feet, being reduced in size, as the different branches to the radiators are taken off and connections to the radiators being made by means of quick opening radiator valves.

The return is taken from the opposite end, the same size as the flow pipe, and carried back to the bottom of the heater so as not only to take the place of the hot water leaving the boiler, but also to give the force of the drop in the pipes.

Water contains more or less air, which, as the water is warmed, rises to the top, so that an air vent should be placed in the top of the radiator opposite the feed sections and opened occasionally for the exhaust of this air and to maintain a circulation.

Steam.

Steam work differs from hot water work; first, in that it has one pipe instead of two, the steam going from the boiler and the water of condensation returning through the same piping.

The main piping in a steam plant instead of pitching up from the boiler, as in hot water, pitches down from the boiler. After the different branches are taken off, a smaller pipe, called the return pipe, is brought back to and into the bottom of the boiler.

The risers and connections to the radiators are taken either from the side or top, as thought best; the horizontals being made one size larger than the uprights; the condensation from the steam returning by the main piping and the return pipe.

Steam radiation should be about one-third less than hot water radiation, the style and make of the boiler being one of the most essential items to be taken into account. In ordinary house work, the upright sectional boiler is preferred to the horizontal tubular boiler, which is used in large buildings. These boilers are usually set on a good brick base, covered with about two inches of asbestos covering, well put on, dried, shrunk and recemented, until there is no further shrinkage..

Automatic Temperature Regulation Of Heating Plants.

About 1883 improvements were made by using thermostats to regulate the temperature of the home by controlling automatically draughts and damper of the heating plant. From this small beginning constant advancement has been made until at the present time, temperature controlling is as essential to the complete heating plant as the draughts.

In selecting a device for the control of the temperature of the house, several things are important. Select a device that is simple in its construction and operation, easily applied and kept in order; a device by means of which the point of temperature desired to be maintained can be changed quickly and readily without going to the basement. The last thing to consider is the expense. The difference of a few dollars on a device of this kind is immaterial. The lasting qualities, construction, installation and, as before mentioned, simplicity, are all important matters, and should receive careful consideration.

After having selected the device, care should be used in the location of the thermostat, as this is all important. See that it is located in a living room and that in its location it is not exposed to unusual conditions of draughts, etc. An inside partition is better than an outside wall.

By means of the automatic heat regulator, it is possible, with a properly constructed heating plant, to maintain the temperature of the house at practically a fixed point, night and day.

Conditions in Chicago.

Cannot the Strike Now be Settled?

THE building strike and lockout in Chicago has dragged its weary length along until all reasonable men are justly tired of it and long for a settlement. Nothing seems to stand in the way now but foolish pride in the rebellious hearts of a few men who have put themselves on record and cannot see any way to change their position honorably. This is true of masters and journeymen. In the Building Contractors' Council there are a few men, like Victor Falkenau and his associates, who have borne the brunt of the executive work of the fight, and who have uncompromisingly taken the position that there could be no settlement until the Building Trades Council should dissolve. To these men it is undoubtedly hard to let up one jot or tittle in their demand. But, speaking for the plumbing trade, we know we state the feeling of a majority of the conservative element when we say they are heartily sick of the uncompromising methods of those in control of the Building Contractors' Council, and would welcome a more conciliatory course. They cannot see the justice in demanding their journeymen to abandon a central form of organization, while they maintain such an organization themselves. Nor is this position a tenable one. The public is not with the contractors on that proposition. The only possible argument which they can justly put forth as to why the Building Trades Council should be done away with is that it has been badly officered, and managed arbitrarily, which is true. But the despicable Mr. Carroll and his agents are out of office. Carroll himself has resigned, the presidency of the council having been discredited and repudiated by his own association. Johnny Long has moved away, and another labor leader has given place to a better man. Hence it would seem that the present is an opportune time to effect a settlement. With new and we hope better officers in control of the Building Trades Council, could not the Building Contractors' Council waive a point in its demand for the abolition of the council, and extend the olive branch, and by conciliatory methods effect a settlement?

It seems to us this could be done without any injury to pride and with a vast help to business.

The public has a right to demand that the contractors end the fight. It suffers seriously in a way it does not suspect. It is true there is some plumbing work being done by non-union journeymen, but there is no doubt it is nearly all badly done. Non-union men are not, as a rule, as competent as union men, and their work is very unsatisfactory to the master plumbers, who know what good work is and who want to do it. Some of the botch work done in Chicago by non-union plumbers would be laughable were it not a serious menace to health. Among the men who have been working this summer have been a number of master plumbers who were willing to go out of business and work for their fellow-associates, and some of the worst work has been done by them.

A little gentle courtesy, a little forgiveness, a little humility, and a little justice between master and man should end this detestable condition of affairs before October has passed.

Who Shall Decide When Doctors Disagree?

A reporter for "Domestic Engineering" recently interviewed a number of men—masters and journeymen—who have taken a prominent place in the long drawn-out strike and lockout of the Chicago plumbers. His mission was to get a comprehensive view of this unique struggle in the hope of being able to make a reasonable forecast of its probable outcome.

The result of his investigation was confusion worse confounded. Both masters and journeymen replied to his queries very much as Terence replied to his sympathizing friends, "Yis, it's mesilf that's a bit battered up, but yez should see Casey!" Both classes were willing to admit that they had suffered through the suspension of business caused by the dead-lock, but each was confident that the other would come to terms in the long run. In fact, the main feature of the struggle is the dogged determination of each party to wear out the patience of the other by the Fabian policy of delay.

So far as could be ascertained there is very little of the bitter feeling which marked the beginning of the trouble, and very few cases reported where non-union men are molested or their work disturbed. Masters and former employes meet and discuss the situation good naturedly, but part with the agreement to continue their disagreement.

Asked what seemed to be the chief bone of contention, all were agreed that it was the determination of the masters to compel the journeymen to withdraw from the Building Trades Council, while themselves continuing to be members of the Building Contractors' Council. The question of wages seems not to enter into the consideration, and the schedule of work, which was so bitterly wrangled over at first, has ceased to be an issue. But as regards the paramount issue, there seems to be no weakening on either side. The masters contend that they now have no quarrel with the Journeymen's Union, but must refuse to recognize the Building Trades Council except as a meddlesome outsider. Furthermore, they must insist that their former employes shall renounce all allegiance to the council before returning to work. On the other hand, the journeymen regard this as an infringement on their liberty and an attempt to weaken their defense should another trial of strength ever become necessary. They profess willingness to pull away from the Trades Council if the masters will leave the Contractors' Council.

The information gathered from masters and journeymen as to the amount of work being done by each was sadly at variance. The masters cheerfully assured the reporter that they had about as many non-union men as they needed to take care of their orders, and that as for the union men, it was only once in a while that they found a master plumber weak-kneed enough to take them back on any terms. Yet those high in authority among the journeymen assert that only about a hundred of the men locked out are now out of work, and these they expect to place at work on jobs now being figured on. As for the masters, so say the journeymen, they are weakening all along the line, and it is only a question of time when they will be compelled, for want of competent workmen, to take back the locked-out men.

The outcome of the matter seems—at least to an outsider—a very doubtful question. In the minds of the interested parties there seems to be no doubt. The masters are confident that the men must come to their terms before snow flies, and the men are equally confident of a settlement on their own terms before long, and there were grim lines of determination on the faces of all the men consulted on both sides which said all too plainly, "The end is not yet."

Gleaned from our weekly Issues.

Joined the Association.

Geo. Fethler, who has recently started in business for himself at 1326 N. Halsted street, was admitted to membership in the Chicago Master Plumbers' Association at a meeting held Sept. 4.

Resting in Colorado.

W. Thomas Innes, of 1816 Wabash avenue, after a season's hard work, is enjoying a well-earned rest in Colorado, where he has gone for a several weeks' stay. He expects to return to Chicago about Oct. 1.

Mr. Walsh Quite Ill.

David Walsh of 6848 South Chicago avenue, is laid up at his home, where he is confined to his bed with an attack of

congestion of the lungs. Mr. Walsh had been ailing for some time, and it is supposed that his sickness has been brought on by overwork.

MR. BREEN NOW OF KALAMAZOO.

Joseph B. Breen of Kalamazoo, Mich., visited the city last week on business. He has given up his local business entirely, having been succeeded in the business by his former bookkeeper, John J. Carmody, who has opened a shop at 375 West Van Buren street.

GOING INTO BUSINESS.

Albert E. Cotrell intends to open a plumbing shop in Washington Heights. Mr. Cotrell was formerly in business for himself in Toronto, Canada, where he learned his trade. He expects to take the State examination before the local Board of Examiners during the coming week.

RETURNED FROM EUROPE.

M. Dillenburg, 1511 West Fifty-first street, returned last week from a three-months' trip to Europe, where he had an enjoyable vacation. He spent two weeks at the Paris Exposition, and also a week in London, although most of his time was taken up in his native town of Luxemburg, Germany.

MR. CORBOY GETS A SCHOOL.

M. J. Corboy has been awarded the contract for the plumbing and gas-fitting of the twelve-room addition which is being built to the Dorr School on West Harrison street, near Halsted street, at his bid of $3,864. The contract for the sewerage in the same school has been let to A. H. Watson, 287 N. Carpenter street.

CHANGE IN AN OLD BUSINESS.

Daniel J. Rock, 118 N. Clark street, has recently opened a branch shop at 1402 Wrightwood avenue. Mr. Rock, who has carried on the business alone since 1860, has taken his sons into partnership, and it is expected that the active management of the business will in future devolve upon them. The new firm will be known as Daniel J. Rock & Sons.

THE MANDEL JOB GOES TO QUAY.

The contract for the plumbing and steam-heating of the large ten-story building which Mandel Brothers are putting up at Wabash avenue and Madison street, has been let to the D. M. Quay Co., Monadnock block. The building will be occupied as a department store, and although it will not contain as much plumbing as an office building is considered quite an important job. W. W. & A. E. Wells are the general contractors.

CONTRACTORS' DIRECTORY.

The Building Contractors' Council has just published in book form a directory of the members of the different associations affiliated with the council. The directory contains the names of all the contractors in the various branches of the building business who have acted in accord with the principles of the Contractors' Council during the present strike, and will be distributed among the architects of the city for future reference.

MR. EDSON IN TOWN.

E. O. Edson of Cedar Rapids, Iowa, was a visitor in the city last week. Besides his plumbing business, Mr. Edson is interested in several outside ventures, and always carries some of his "Diamond Contracts" in his inside pocket when visiting the local plumbers, which he guarantees will net a better investment than can be got out of the plumbing business.

A FEW PLUMBERS GO TO WORK.

Union plumbers have decided to return to work to-day for all contractors who will pay the union scale of wages and grant union conditions. The action was brought about by the knowledge that other unions were allowing their members to work under similar conditions. After a long discussion the proposition to return to work without agreements being signed was carried by a large majority of the meeting.

AFTER PLUMBERS FOR BLOOMINGTON.

A delegation of master plumbers from Bloomington, Ill., consisting of R. R. McGregor, Geo. McIntosh, Maurice McCarthy and Frank Morrison, are in Chicago this week for the purpose of securing non-union plumbers to take the places of their old men who are now out on strike, and whose demands they refuse to recognize. As nearly all the non-union men are already employed, it is not expected they will be able to obtain much relief from Chicago.

A REMODELING JOB.

The plumbing of the Kuh, Nathan & Fisher building at Franklin and Van Buren streets will be remodeled. The entire plumbing system will be altered to accommodate a larger number of tenants than now occupy the building. The work of changing the plumbing, which will not commence before January 1, will be done by Jacob Adler 3519 State street. Besides this work Mr. Adler has a number of small contracts and also a large amount of overhauling work on hand.

TWO FINE DISPLAYS.

Jacob G. Weber has recently completed the remodeling of his two plumbing shops, one at 244 N. Clark street, and the other in Lake View. He has had installed in both stores all the latest sanitary specialties and the display window in each has been fitted up with the most elaborate and expensive bath-room fixtures, presenting a handsome appearance. Mr. Weber has found a profitable investment in window display, his work in fitting up bath rooms amounting in one year alone to almost $40,000.

GEORGE TIPPLE TOPPLED.

A rather unfortunate accident happened to George Tipple on Sept. 19. While working on an overhauling job at St. James place, near North Clark street, he fell from a ladder on which he was standing and broke one of his legs. He was taken to his home, and it is feared it will be several months before he will be able to get around. Mr. Tipple, who conducts a plumbing shop at 1587 North Halstead street, met with a similar accident about two years ago, which detained him from business for nearly a year.

PRETTY GOOD JOB.

Plans have been completed for the erection of a block of buildings comprising six flats and five stores at One Hundred-Fifteenth street and Michigan avenue, for Leon Avignon, 243 One Hundred-Eighteenth street. Figures for the plumbing which will include the latest modern fixtures are being taken this week. Wm. Beauchamp, 2599 One Hundred-Fifteenth street, who is a tenant of the owner, will most likely secure the plumbing contract. Huber & Hatzfeld, 172 Washington street, are the architects.

MR. POTTS AGAIN IN BUSINESS.

The friends of T. W. Potts will be surprised to learn that he has again embarked in the plumbing business, after an absence from the local field of nearly five years. He has formed a partnership with Phillip Gollner of 3406 Archer avenue, and his large acquaintance gained from his many years experience in the plumbing business, will do much to insure success for the new firm. Mr. Potts expects the firm will open a shop in the down-town district near his old location at Randolph street and Wabash avenue.

WILL OPEN A TRADE SCHOOL.

The Industrial Union expects soon to establish a trade school where the apprentices in the various building trades will receive the benefit of a technical as well as practical education. The officers of the union have made arrangements with the Lewis Institute and only await the co-operation of the employers before forming different classes where apprentices will receive instruction two evenings of each week for a period of ten weeks every year. According to present plans it is proposed that the entire course shall cover a period of three years.

INCREASING NUMBER OF NEW SHOPS.

One of the most noticeable effects of the strike is seen in the large number of plumbing shops which have opened during the last few months. In every strike in the plumbing trade there is always a few journeymen who embark in business for themselves, but the exceptionally long duration of the present strike has caused a greater influx than would otherwise have been possible. It is estimated that nearly two hundred journeymen plumbers have started in business since the strike began, but as only a very small per centage of those have appeared before the Board of Examiners to take the state examination, it is not

believed that many of the journeymen who have recently started up, will remain permanently in the business, but return to work as soon as normal conditions prevail.

PLUMBER KILLED BY SEWER GAS.

While employed in cleaning a sewer pipe at 184 North Green street on Friday, the 14th inst., William Herbst, who conducts a plumbing shop at 512 North Ashland avenue, was overcome by sewer gas, and died the same day. Peter Pederson of 119 Grand avenue, and Edward Hanson of 295 Milwaukee avenue, who were helping him on the job, were also overcome, but rescued in time and resuscitated at a neighboring drug store. William Herbst was the oldest son of William Herbst, Sr., who has been engaged in the plumbing business for many years at 191 Milwaukee avenue.

A PLUMBER BEATEN.

Martin A. Brosman, a plumber employed in a building at Lill avenue and Halsted street, was set upon by five men last Saturday afternoon, who beat him with clubs. His cries attracted the attention of officers of the Sheffield avenue station, but they were unable to arrest any of the assailants. Brosman was taken to the Alexian Brothers' hospital, where the attending physician found that he had sustained a fracture of the nose and other bruises about the head. He is unable to tell the police why the men assaulted him, but, of course, it is thought that the men were strikers. Brosman lives at 690 West Lake street.

MORE SLUGGING REPORTED.

Four non-union steamfitters who were working on a residence at 5743 Woodlawn avenue, were attacked by ten union men on Monday last and Andrew White, one of the non-union men, was so badly injured that he had to be taken to his home in an ambulance. His three companions, Philip J. Bergens, Edw. Desormeau and William Havey effected their escape without being injured. William Havey procured a revolver and fired several shots at the assailants, but none of them took effect. All of the non-union men, with the exception of Andrew White, were in the employ of P. Nacey Co.

SCHOOL CONTRACTS.

Figures have been taken during the last week on the plumbing of several new schools which the Board of Education proposes building in the near future. The contract for the plumbing of the Calumet avenue school, which is to be erected on Calumet avenue, between Forty-first street and Forty-second street, has been awarded to the Harvey & Mose Plumbing Company, 680 West North avenue. The plumbing amounts to $5020. The steam-heating of the same school, which will cost in the neighborhood of $7,000, has been let to William A. Pope. The contract for the plumbing of the new school to be built on Thirty-third place, between Auburn and Morgan streets, has been let to A. H. Watson, 287 North Carpenter street. Kehm Bros. & Metz were the successful bidders on the steam-heating,their bid being $6,480.

A BASKET PICNIC.

The Northwest League of Master Plumbers held a basket picnic at Rieger's Grove, on the Desplaines river, on Sunday, Sept. 9. This is the second outing which the league has given this season and nearly all the master plumbers of the northwest side were present with their families and friends. The party met at the plumbing shop of Henry Breyer, who was chairman of the arrangement committee and proceeded from there in wagons to the picnic grounds. A base ball game between the plumbers of the Fourteenth ward and those of the Fifteenth ward was decided in favor of the former, who won by a score of 8 to 6.

INCREASING ACTIVITY.

During the last two weeks the plumbers report an increased activity in the jobbing and overhauling trade, and the demand for journeymen plumbers has grown accordingly. Notwithstanding the handicap under which they are placed the master plumbers claim they are able to take care of all this class of work with the non-union men now in their employ. There are several important jobs which will soon have to be started which will require the employment of a large number of plumbers and the union men point out that there is not sufficient non-union men in the city to do the work and that union plumbers will have to be employed.

INCREASED PRESSURE CAUSES BREAKS.

Since the Central Park pumping station was started, some weeks ago, the plumbers on the west side of the city have been kept busy repairing leaks in bursting water pipes. It is claimed that the increased city pressure has caused the bursting of many old and defective pipes. The people of the west side have seldom been able during the summer months to obtain water above the second floor, but with the increased flow are now able to get an ample supply without the use of pumps. The Springfield Avenue pumping station, which will supply the northwest part of the city, is almost completed and will soon be set in operation.

STEAMFITTERS FREE TO WORK.

Members of the Journeymen Steamfitters' union are now at liberty to work for any employer who pays union wages and employs union men, regardless of any agreement. At the regular meeting of the union last Monday night it was decided to drop aggressive tactics. As many of the master steamfitters have shown a disposition to hire union men if they could do so without signing an agreement, the action of the union last Monday night will probably end the controversy as far as the steamfitters are concerned for the season. James Daley, the steamfitters' business agent, declined to stand for re-election on account of his candidacy for county commissioner, and Charles Rau was elected his successor.

DO THEY DESTROY WORK?

Several cases have been reported during the week where union men are alleged to have destroyed work done by master plumbers in new buildings. At Oakdale avenue and North May street, where the plumbing of six flats had been roughed in, the soil pipe was smashed and the different fittings completely destroyed, the damage amounting to about $200. O'Shea Bros., 1969 North Clark street, are doing the plumbing. The same day on which this occurred the gas-pipeing of a residence at 62 Lake Shore Drive, which had been put in by non-union men in the employ of M. J. Corboy, was torn out, and the entire work will have to be replaced, at a cost of $250. In neither case has any clew been found as to the perpetrators, although the matter has been reported to the police department.

COULD NOT WITHDRAW.

A determined but unsuccessful attempt was made by the Journeymen Plumbers, at their meeting Sept. 24, to withdraw from the Building Trades Council. The question of withdrawal was considered, but was finally tabled, after several efforts had been made to bring the matter to a vote. Owing to the growing dissatisfaction which has been apparent in the ranks of the journeymen for severad weeks, it was confidently believed that a resolution to withdraw would be favorably received by the members. A week ago the union gave its members permission to go back to work under any conditions for any master plumber who agreed to pay the regular wages of $4 per day, without requiring the employers to sign an agreement which was formerly insisted upon. The men were even allowed to send in a written resignation to the union in order that they could return to work. The master plumbers claim their position is in no way altered by this action of the journeymen, and state they will steadfastly adhere to the policy of not having any union man while the union remains affiliated with the Building Trades Council.

RETURNED FROM EUROPE.

M. Abrahams, that well-known master plumber on Archer avenue, has returned to business after an extended and profitable vacation in Europe. He left Chicago April 28 and returned Aug. 25, during which time he visited England, spending several days in Southampton and eleven days in London, three days each in Antwerp and Brussels, in Belgium; in Germany he was in Cologne three days; Berlin, three days, and Munich a week; in Australia he was eight days in Carlsbad,

two weeks in Prague and two weeks in Vienna, visiting the palace of Franz Josef at Schonbrunn; he visited the Paris Exposition for eight days, and returns to 1909 "Archy Road" filled with the belief that Chicago is God's country. He saw no gasoline furnaces while he was gone, in Germany he saw no wiped joints, and in London all soil and vent pipes are run outside the buildings.

RESOLUTIONS ON HUGH WATT'S DEATH.

The following resolutions were adopted at a regular meeting of the Chicago Master Plumbers' Association, held Tuesday evening, Sept. 4th:

At a regular meeting of the Chicago Master Plumbers' Association, held on Aug. 14, a committee was appointed to draft resolutions of condolence on the death of Hugh Watt, which occurred on Aug. 5, 1900. The committee reported as follows:

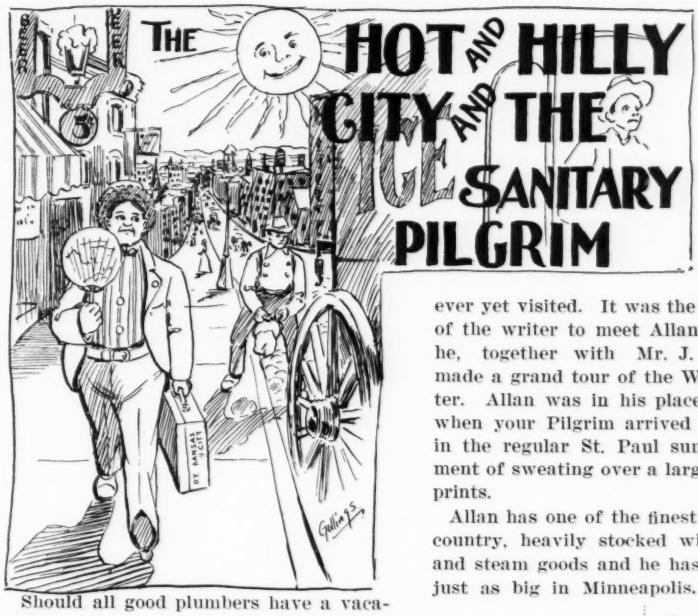
Death has been busy in our ranks and again we are called upon to mourn the loss of one who was dear to us for his kindly heart and nobility of soul. He was a man such as the poet had in his mind when he penned the words "An honest man is the noblest work of God." His sturdy figure showed the staunch character of the man, and his death in the fulness of years brought to an end a noble and useful life.

Resolved, That it is with deepest and most sincere regret that we are called to pay this, our last tribute of respect to the memory of our deceased friend and co-worker, Mr. Hugh Watt, who was one of the most earnest and energetic members of our organization. His life work in whatever field his inclination led him was of such a character as to merit the reward of favorable public approbation, that reward which time alone can efface. We have met him in a social as well as business capacity and have never found him wanting. His was a useful mission on earth and the example of his life may well be followed by us all.

Resolved, That in his death this association has lost a valued and respected member, who always took an active interest in the affairs of the association, both during his term of office as president and the period which preceded the sickness that confined him to his home so many years.

Resolved, That we too well realize that nothing can be done to make good the loss we have sustained, which though severe is trifling to the great loss that must be endured by those dearly allied to him, his family, to whom we tender these few words expressive of our sorrow and sympathy in their sad hour of bereavement, and that a copy of these resolutions be spread upon the records of this association and an engrossed copy forwarded to the family of the deceased.

Andrew Young, David Whiteford, Thos. Havey, Committee.



Should all good plumbers have a vacation and if not why not? Is it necessary for all noble Hot Fog Fitters to toil on and never disconnect themselves from the chain tongs or the deadly roll of blue prints? It was to solve this problem and to join his family who had fled from the August weather which induced your scribe to penetrate the deadly heat of Minnesota and explore the tropical jungles of St. Paul and Minneapolis.

The Citizens of St. Paul and the denizens of Minneapolis assured your scribe that such hot weather was never known

Allen Black and Frank S. Priggs singing their famous duet.

in Minnesota and he is glad it is not, for St. Paul is most beautiful of situation and Minneapolis one of the busiest and most metropolitan cities your Pilgrim has ever yet visited. It was the good fortune of the writer to meet Allan Black when he, together with Mr. J. L. Sullwold, made a grand tour of the West last winter. Allan was in his place of business when your Pilgrim arrived and engaged in the regular St. Paul summer amusement of sweating over a large set of blue prints.

Allan has one of the finest shops in the country, heavily stocked with plumbing and steam goods and he has another one just as big in Minneapolis. Allan's St.

St. Paul Selwold selleth large gobs of goods.

Paul shop was formerly an opera house. The old stage and part of the scenery are still there. If a prospective customer comes in with a real good order, Allan Black and his Fust Assistant, Frank Spriggs, take to the stage and start singing a duet. If the man recovers the job is theirs. Allan Black, like all true Caledonians, makes a visit back to Scotland occasionally. He makes gas fixtures every day and he makes money when any of them do, although I fear the crop failures will make thin picking in the Twin Cities this year.

The Western Supply Co. is where J. L. Sullwold holds forth, and there is no better man to be with, either in or out of business hours. He is a good looker and a good feeler. His company occupies five (5) stories chuck full of goods. They sell Sieben floor drains and sitz baths to the plumber, St. Paul boilers and steam traps to the steam fitters and the fair haired Scandinavian dude farmer can back up his wagon and load up a wood pump or a wind mill if he coughs up the price. Who is that well dressed gentleman who just came tearing up to the

horse trough and tried to water his bicycle. He must be an absent minded beggar, said your pilgrim, not so, said Frank Spriggs, my guide, that is the famous O'Neill, the pride of St. Paul, said Frank, he owns a big double store full of plumbing goods and fine gas fixtures. He figures plans until bed time and then rolls them up and uses them for a pillow. He does large blocks of flats in rag time, in short he is the St. Paul pusher.

Crane-Ordway is one of the great many branches in the United States which the great Sand Hill Crane, the only R. T., is the father of. They have a great big stock in the big building and do a big business. All Crane houses do, if they don't R. T. starts in and jars something or somebody until they do. Mr. Ordway was out of town. He has a national reputation as a yachtsman, so R. T. was entertaining him over at White Bear Lake at a regatta and very appropriately too, for Ordway increased his sales last year and Mr. Crane treats Ordway to a few Sails to even up things a little. It is said the yacht carries a quantity of large cold Bottles as Ballast. Mr. C. F. Arper was presiding the day your pilgrim arrived. Mr. Arper is a busy man

Rear Admiral Crane taketh Commodore Ordway sailing at White Bear Lake.

but he was kind enough to trot me around the establishment. They have a show room like all jobbing houses have one time or another, but Arper's motto is fill orders if you filch the show room, hence the lavatories were legless and the closets were tankless to some extent, but the orders were filled promptly and that is what Crane houses are for.

"Is not this the great Jim Dunnigan," said I, pointing to the tall old war horse of the M. P. association, who drifted in just then. Dunnigan! The man who swipes joints between a lath and plaster partitions where the kid pours solder down on his cloths from the second story. Dunnigan! The man who calks forty feet of soil pipe together and drives it clear through the cellar wall half way across the street and into the main sewer? Correct, said John J. Dwyer, who joined our party, "that's Dunnigan, and what he does don't need to be Done-again either." Please don't blame the

A Trade Mark suggestion for Jno. J. Dwyer.

writer for this pun because it is only one of the many jokes of the Bostonese appearing and keen witted Mr. Dwyer. Let loose on me, this story could not have been written without him and he is a young man with eye glasses who will keep in any climate. Dwyer was just fitting up a show room with Turkey red walls and if further proof of his ability is needed, he had just completed a government contract and had money left.

Wonderul is St. Paul and its plumbers.

Minneapolis, Minn. (From a Staff Correspondent).—Business still continues quite brisk and there is little complaint of dull times. All indications point to a busy fall.

Mr. Wallin Hurt.

Jack Wallin, president and manager of the Wallin Bros. Plumbing Company, Franklin avenue, suffered a painful accident by a fall from his bicycle. He broke his collar bone and has been laid up for two weeks.

Returned Home.

W. S. Bayley and wife have just returned from their visit to Boston and New York. Mr. Bayley reports an enjoyable trip and an improvement in health, this latter due, no doubt, to a brief rest from the trials and troubles of a plumber's life.

May Raise Hares.

Edw. Sohler, "Der Deutcher" plumber, is seriously considering entering the Belgian hare business. He may locate in the vicinity of Plymouth and Washington ave., north. Mr. Holtzman and Jim Fay will be financially interested in the business.

Will Do Plumbing, Too.

The Kelly & Lamb Heating Co. have branched out into the plumbing business and hereafter will be known as The Kelly & Lamb Heating and Plumbing Co., with M. Fox, manager of the plumbing branch. They have a contract for plumbing and heating the new Chute building on Central avenue.

A Cleveland Plumber Here.

Mr. Leese, of the firm of Warden & Leese, plumbers, at Cleveland, Ohio, was a visitor in the Mill city the latter part of August. Mr. Leese was on a pleasure trip and came to Minneapolis via the Great Lakes route. He believes our city to be as clean, neat and pretty as any city he has ever visited and he has traveled much.

Some Good Contracts.

Bjorkman Bros. and Westman, of Park avenue, have the contract for plumbing St. Olaf's college, being erected at Northfield, Minn. The building must be completed and turned over to the management by Jan. 1, 1901.

The Archambo Heating & Plumbing Co. are plumbing and heating the new telephone exchange building, southeast.

A. W. Scott is doing the plumbing in the Thresher Co.'s new building on 3rd St. South.

Strenuous Strenuosity.

There was considerable competition among the local plumbers for the work in the row of flats to be built by Mr. Holtzman, of Washington avenue, north. One plumber waited through a three-hour rain storm for his man, another threatened to thresh the employer of Mr. Holtzman for not allowing him to see him during business hours, and others became more or less excited, and according to the last heard of the matter Mr. Holtzman was sawing wood and the contract had not been let.

Plumbers On Labor Day.

Labor Day was observed by the people in general and fully six thousand men were in the parade. The unions vied with one another to make the neatest and most attractive showing. Our plumbers easily carried off all honors; they did likewise last year. They wore white duck pants, white shoes and belts, white shirt waists and straw hats. Each carried a red, white and blue umbrella and wore an American beauty rose in buttonhole. They were certainly swell toddies.

Unlucky Plumber.

Traverse City, Mich. (From a Staff Correspondent.)—Del Minard, of Elk Rapids, while putting in some plumbing work, struck his shovel against a dynamite cartridge and had the fingers of one hand blown off.

Another Fool Plumber.

Owossa, Mich. (From a Staff Correspondent.)—Recently one of the plumbers employed at the school house came down after some gasoline oil. On his return he noticed that the can was leaking so he took an unburned match and pushed it into the hole. This not being enough he commenced to pound it in further. Result, the match ignited and the can exploded. No serious damage was done.

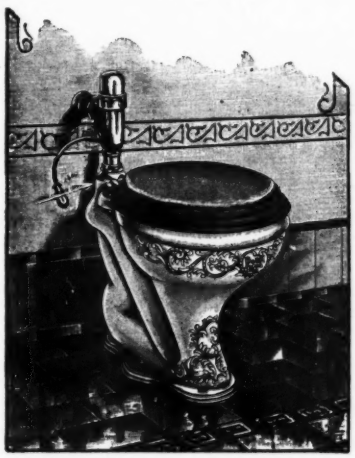
RANGE BOILERS.

For over twenty years Wm. B. Scaife & Sons of Pittsburg, Pa., have been manufacturing galvanized range boilers and hundreds of them set in place over twenty years ago are still in use giving good satisfaction. The seams are brazed and the boilers are thoroughly tested and it is claimed they are heavier, stronger and more durable than many others. A complete catalogue will be mailed on application mentioning "Domestic Engineering."

J. T. Corcoran, Brockton, Mass., is fitting up a fine toilet room in that section, using Cooper's Atavic flushing valves.—Adv.

THE AQUAMETER.

The Peck Bros. Co., 231-237 Washington street, Chicago, Ill., manufacture the "Aquameter," one style of which we show



herewith. It is a self-measuring flush valve for water closets and urinals, automatically measuring the water used in each flush. It may be attached directly to the pipe from the city main or from the storage tank. It is made in two styles, in lever or seat action. There are no cup washers in its construction. Upon application mentioning "Domestic Engineering" a list of buildings throughout the country in which the "Aquameter" is used will be sent.

H. Kelly & Co., of Minneapolis, recently set one of Cooper's Nautilus closets.—Adv.

A PUMP CATALOGUE.

The pump catalogue of Hess-Snyder & Co., of Massillon, Ohio, should be in the hands of every master plumber who sells cast iron pitcher pumps. It is a useful book for reference and to show customers styles of pumps not carried in stock. It will be sent upon application mentioning "Domestic Engineering."

Field, Shorb & Co., Decatur, Ill., have some repair work on hand in which they are using one of Cooper's Nautilus closets.—Adv.

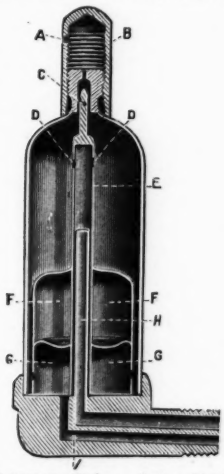
GEGENSTROM BATH APPARATUS.

The Rundle-Spence Mfg. Co. of Milwaukee, Wis., are western agents for the Gegenstrom bath apparatus which supplies warm or hot water by means of steam and is especially designed for use in asylums, gymnasiums, prisons, hospitals, club houses and public institutions. With this apparatus three or four persons can be bathed together and the illustration on page 104 shows how it can be operated. The water will never exceed 120 degrees, consequently the danger of scalding is averted. It is operated by an attendant so that irresponsible persons cannot misuse it.

W. S. Richards, Medford, Mass., is renovating the bath room in a fine residence in that city, using Cooper's Nautilus closet.—Adv.

THE ARGON AIR VALVE.

This sectional view of the Argon automatic air valve illustrates its operation clearly. Its manufacturers, the Argon



Mfg. Co., Denver, Colo., claim that it is the only air valve on the market which is equally efficient on both steam and hot water radiators. It is tested for air, gas, steam, water and for service and perfection. The users of valves should write for sample mentioning "Domestic Engineering."

Clark Bros., of Philadelphia, are making some repairs to the plumbing in the offices of the Clyde Steamship Co., using Cooper's Nautilus closet.—Adv.

ERIE PIPE HANGERS.

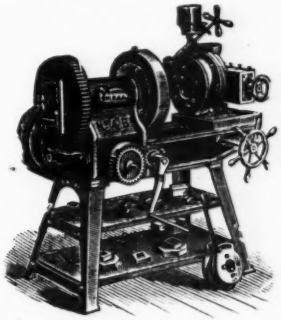
These three illustrations show a portion of the Erie pipe hanger. This is a very simple, inexpensive, efficient and easily

operated pipe hanger. A circular giving description and price will be sent by the Jarecki Mfg. Co., Erie, Pa., if you write mentioning "Domestic Engineering."

Grand Island Plumbing Co., Grand Island, Neb., are setting two of Cooper's Nautilus closets in some good work they have on hand.—Adv.

SAUNDERS' CUTTING MACHINES.

This illustration is No. 4 B from the catalogue of D. Saunder's Sons, 35 Atherton street, Yonkers, N. Y., and shows one of their many styles of pipe cutting and



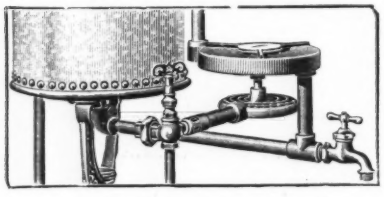
threading machines. This one will cut ½ inch to 4 inches by hand or power. They also make pipe vises in all sizes and styles and pipe cutters. Catalogues are free for the asking if you mention "Domestic Engineering."

John W. Cosden & Co., of Boston, is making some repairs to the plumbing of a large house in that city, using Cooper's Nautilus closet.—Adv.

RANGE BOILER HEATERS.

This illustration shows the Hollands water heater with a connection from the bottom of the range boiler and from the

top of the burner for a nipple of any desired length. This saves a hot water boiler and heats the water quickly and it can also be used as a one burner hot plate. Upon application to the Hollands



Mfg. Co., Erie, Pa., mentioning "Domestic Engineering" a catalogue showing this and other gas specialties will be sent.

Samuel Spitler, Brookville, Ohio, is doing some plumbing work for Mr. L. J. Bickert, Leslie, Mich., in which they are using one of Cooper's Reno closets.—Adv.

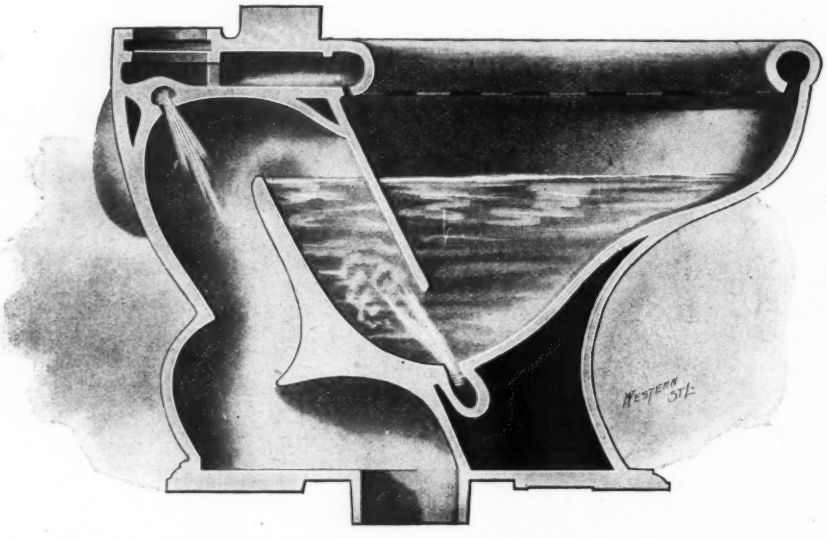
GAS MACHINES.

The C. M. Kemp Mfg. Co. of Baltimore, Md., will be glad to forward to readers of "Domestic Engineering" who write mentioning this paper, a description of their gas machines. They have made the production of these machines a matter of many years' study and the machine bears out all the claims they make for it in its performance.

The McElroy-Hudspeth Plg. & Htg. Co., of Pueblo, are just finishing some work in which Cooper's Reno closets were used throughout.—Adv.

THE BONITA CLOSET.

This is a sectional illustration of the Bonita, double jet, low down syphon closet as made by the L. M. Rumsey Mfg. Co., St. Louis, Mo. There is no complaint in connection with this closet because of the lack of pressure. This difficulty is overcome with this closet by adding a

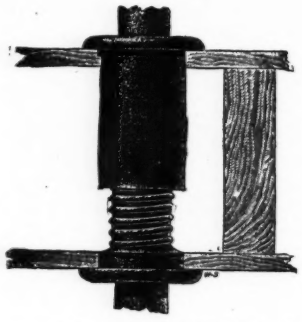


downward jet into the discharge leg of the closet which drives the air out of that leg and removes resistance to the upward jet. This downward jet is effectively trapped to prevent gas passing through it into the flushing rim. Upon application mentioning "Domestic Engineering" a circular showing this closet as it appears set up will be sent.

Wm. Newell & Bro., of Philadelphia, recently completed the plumbing work in the house of Mr. Wm. Burnham, of that city, using Cooper's Reno closet, Special bath, lavatory, etc.—Adv.

VOSBURGH FLOOR THIMBLE.

The N. O. Nelson Mfg. Co., St. Louis, Mo., manufacture the Vosburgh floor thimble and ceiling plate, which we illustrate



herewith. It is adjustable as may be seen from the illustration, and meets all the demands made upon a floor plate. Upon application mentioning "Domestic Engineering" prices will be sent.

Dougherty & Dean, of Philadelphia, are making some additions to the plumbing in the house of Mr. Stephen Burke, of the Philadelphia "Public Ledger," using Cooper's fixtures exclusively.—Adv.

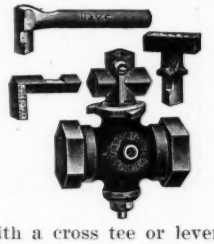
HOOKS.

We wonder if the plumber realizes how much can be saved by buying hooks in quantities from the manufacturer. Berger Bros. Co., 231-237 Arch street, Philadelphia, Pa., make all kinds of soil pipe, gas pipe, malleable and wrought iron hooks and will be glad to send catalogue upon application if you mention "Domestic Engineering."

W. H. Mitchell & Son, of Boston, have been renovating a bath room in that city, using Cooper's Nautilus closet, etc.—Adv.

HAYS STOP COCK.

This illustration shows Hays waste stop cock which is a simple and durable cock, easily changed from right to left and fur-



nished with a cross tee or lever handle. In addition to this stop cock the Hays Mfg. Co. of Erie, Pa., manufacture a full line of water and gas specialties including the well known McNamara hydrants and street washers. Upon application mentioning "Domestic Engineering" they will be glad to send catalogue and prices.

E. F. Crosby, Brookline, Mass., is plumbing the new house of Mr. H. F. Briscoe, using Cooper's Nautilus closets, special baths, lavatories, etc.—Adv.

A SYSTEMATIZED BUSINESS.

Directly one enters the jobbing house of the Sanitary Specialty Mfg. Co., at 24-30 Milwaukee avenue, Chicago, they are impressed with the fact that they are looking upon a systematized business. Mr. Verbeek and Mr. Brouwer are both students of the business under their charge and the method under which it is carried on shows the results of this study.

Mervine Bros., of Philadelphia, have on hand the plumbing of two large private residences in West Philadelphia, using four of Cooper's Nautilus closets and other fixtures.—Adv.

THE CLINE GAS MACHINE.

The Cline Acetylene Gas Machine, as made by the Alexander Furnace & Mfg. Co. of Lansing, Mich., is a safe and convenient machine which plumbers should secure the agency for. Terms upon application mentioning "Domestic Engineering."

Samuel C. Turner, Chester, Pa., recently placed one of Cooper's Nautilus closets in a large private residence in that city.—Adv.

BRASS WORKERS BE UP TO DATE.

Manufacturers of brass goods for plumbers and steam fitters must in these days of active competition have up-to-date machinery. The Meriden Machine Tool Co., 106 Britannia street, Meriden, Conn., will tell you upon application mentioning "Domestic Engineering" all about their forming lathes and the work they will do.

McKinley & Northwood, Ottawa, Ont., are plumbing the house of a prominent citizen, using Cooper's low-down Nautilus closet.—Adv.

NAUTILUS CLOSETS.

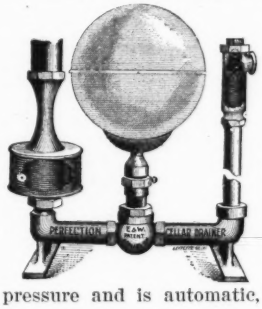
The W. S. Cooper Brass Works, Philadelphia, Pa., have made a practice for some months of publishing items in "Domestic Engineering" which give the names and addresses of plumbers who have been using Nautilus closets and in

these items we notice the names of some of the very foremost plumbers of the country showing that the Nautilus closets are thoroughly appreciated by the best trade.

Dwyer Plg. & Htg. Co., of St. Paul, recently completed some good work in that city, in which they used one of Cooper's Reno closets.—Adv.

Good Drainer for Wet Cellars.

The season is now coming on when rains and melting snows will cause back water in cellars, wheel pits and other excavations which it will be necessary to remove. For this purpose we recommend the cellar drainer shown in the illustration. It can be operated by water or

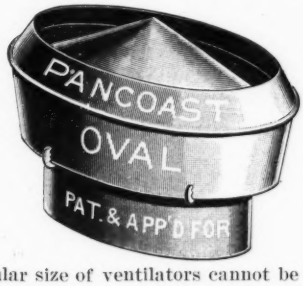


steam pressure and is automatic, starting itself when there is water to be drained out of the cellar and stopping itself automatically when the work is done, and is a strong durable and efficient drainer. Plumbers constantly find their sales of such goods increasing. Upon application mentioning "Domestic Engineering" price list and catalogue will be sent. Address Erwin & Welch, 35-37 S. Canal St., Chicago.

Edward Moore & Co., of Boston, are installing two of Cooper's Nautilus closets in a private residence they have on hand. —Adv.

The Elliptical Ventilator.

The National Pancoast Ventilator Co., 72 Drexel building, Philadelphia, have brought out a new design of their well known Pancoast ventilator of an elliptical shape which we show in the illustration. It is having a large sale. It is largely used where flues are contracted and the



regular size of ventilators cannot be used to advantage. The company report that its sales during the past three months have been larger than in any one year of previous business. This is undoubtedly accounted for by the fact that their goods are giving entire satisfaction and that they have made no advance in price during the last year, being content with small profits and quick sales.

Daniel Graham, of Philadelphia, is renovating the plumbing in the residence of Mr. Henry L. Franks, on North Thirteenth street, that city, using Cooper's Reno closet, Special bath, and other fixtures.—Adv.

The Schnieder Instantaneous Water Heater.

The Schnieder heater has these points in its favor:

1. Its claimed efficiency is 95½ per cent.
2. There is no solder on any part to be melted by the heat.
3. It needs no drip pan.
4. It can be taken apart in sections in a few minutes.
5. There is absolutely no danger from explosions or fire as only 4½ per cent of heat escapes through the vent pipe.
6. One lever controls the water and gas, and the valve is substantially made and will not get out of order.

There are other reasons which will come to light when a trial is made of the heater. It is manufactured by the Schneider Closet & Heater Co., Ann Arbor, Mich., who fully guarantee it to do as they claim or they will refund the money. They claim that it is the only heater on the market that will heat 1¼ gallons of water from 42 degrees Fahr. to 120 degrees Fahr. per minute with one foot of gas at a cost of one cent for a bath of ten minutes' run.

The company is having a great success in introducing its metallic tank low down closet combinations. The tank is made of No. 24 sheet steel with nickel trimmings. The lining is of copper or lead as in wooden tanks. A space is provided between lining and jacket all around to prevent sweating. It has many hygienic qualities. It is claimed it is more durable than a wooden tank, as there are no glued joints to open. They furnish this combination with a wooden seat or with a hygienic steel enameled seat. There is a very liberal discount from prices listed and they solicit orders, mentioning "Domestic Engineering."

I. T. Hirst, of Philadelphia, is plumbing the residence of Mr. Hart, at Wayne, Pa., using Cooper's Nautilus closets, Special baths, lavatories, etc.—Adv.

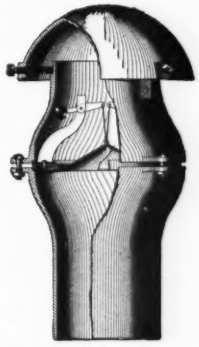
A Guaranteed Float.

The Boston Brass Co., 40 Oliver street, Boston, Mass., has decided to make a float which they can fully guarantee, because of the numerous poor floats on the market. This new float is to be called the BB and it is intended to go with the BB cocks, and every float will be stamped with these letters. The 5 and 6-inch floats are made of 12-oz. tinned copper thoroughly soldered and are tested for leaks before they are shipped. The rods in these floats run through the float, giving a better leverage with which to close the cock and making it impossible for the float to crack, as is often the case when the spud is soldered on the outside of the float. The larger sizes will be made of proportionately heavier copper. They say that all floats bearing the BB trade mark will be fully guaranteed and are as good as a float can be made.

P. J. Glennon, Seattle, Wash., is plumbing a house for Mr. C. J. Lord, Olympia, Wash., using Cooper's Re[illegible] closet and Atavic flushing valve.—Adv.

The Ayres Fresh Air Inlet.

A job of plumbing which does not provide for a fresh air inlet is either scamped or done in a town where the ordinances do not require such an article to be used. If plumbers have to use a fresh air inlet, they should investigate the merits of this. It is manufactured by a firm of plumbers



in Brooklyn, the Hart-Ayres Plumbing Co., Fourth avenue and Degraw street. Upon application mentioning "Domestic Engineering" a circular showing the perfection of the fresh air inlet and reasons why it has been adopted by the apartment buildings in greater New York, will be sent.

E. F. Crosby, of Boston, is installing one of Cooper's Nautilus closets, Special baths, etc., in a large house in that city. —Adv.

The Club, Jr.

The illustration shows the Club, Jr., steam and hot water heater made by the New York Central Iron Works of Gene-

va, N. Y., whose Dunning boiler is so well known that it has come to be known as the "old reliable." It is a new type of heater for small houses.

No. 15 has 175 ft. capacity for steam and 275 ft. for water.

No. 20 has 200 ft. capacity for steam and 325 ft. for water.

No. 30 has 250 ft. capacity for steam and 425 ft. for water.

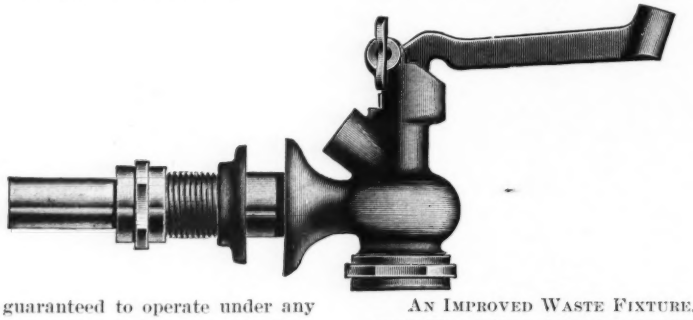
No. 40 has 300 ft. capacity for steam and 525 ft. for water.

Upon application mentioning "Domestic Engineering" a catalogue showing these styles and regular patterns of the Dunning boiler will be sent.

John C. Gibson, of Philadelphia, is renovating the plumbing in the private residence of Mr. C. W. Beck, on North Thirteenth street, using Cooper's Reno closet, Special bath, lavatory, sinks, wash-trays, etc.—Adv.

A Duplex Ball Cock.

We illustrate herewith in a sectional view, the Duplex ball cock manufactured by the F. W. Webb Mfg. Co., 52-60 Elm street, Boston, Mass. This ball



cock is guaranteed to operate under any pressure from one to 300 pounds. They are made in fourteen sizes and styles. A postal card mentioning "Domestic Engineering" will bring you a price list and discounts.

Harry Coffin & Son, of Philadelphia, recently plumbed the residence of Mr. Benjamin Orne, on South Twenty-second street, using two of Cooper's closets, baths, etc.—Adv.

Received a Gold Medal.

The International Heater Co. of Utica, N. Y., have been notified by J. M. Allen, assistant director of affairs in the United States Department, that they were awarded a gold medal at the Paris Exposition. This makes their heaters as they say "Internationally the best." They have a very large line of steam and hot water heaters covering every possible need of the trade. Upon application mentioning "Domestic Engineering" they will gladly send a catalogue.

Stinson, Kennedy & Co., of Pittsburg, have a house on hand in which they are using Cooper's Reno closets.—Adv.

The Dighton Hot Water Heaters.

The Dighton Furnace Co. of Taunton, Mass., are manufacturing hot water boilers which they guarantee will do as much work or more work than any other boiler with the same sized grate. They offer the steam and hot water contractor an opportunity to build up his trade based upon the work and merit of the boiler and a low price. They are so confident that their proposition to contractors is a good one that they will give their money back for the asking, if the goods are not what the contractor expects them to be. When you write them mention "Domestic Engineering."

C. A. Bray Co., of Boston, are using one of Cooper's Reno closets in some work they are doing in that city.—Adv.

The Niagara Radiators.

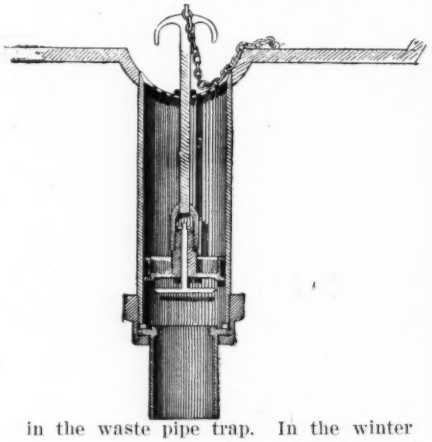
In this number of "Domestic Engineering" will be found a number of illustrations of Niagara radiators which are of a very high grade. A catalogue may be had upon application to the Niagara Radiator Co., North Tonawanda, N. Y., if you mention "Domestic Engineering."

Heater Patterns.

The Vedder Pattern Works, Troy, N. Y., have great success with and make a specialty of hot water and steam boiler patterns. A letter to them will be answered if you mention "Domestic Engineering."

An Improved Waste Fixture.

This illustration shows a plumber's invention. It is Kosiol's improved waste fixture which obviates all disagreeable odors emanating from the accumulation and decay of foul matter in waste pipes. It prevents the accumulation of sediment

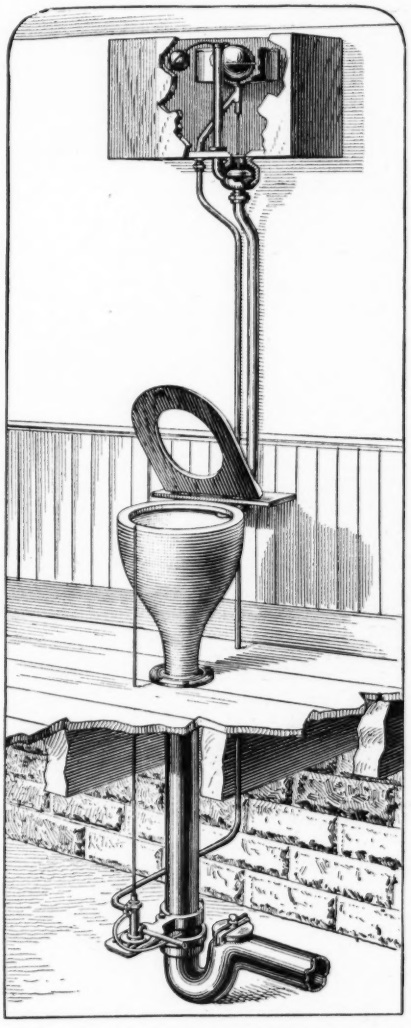


in the waste pipe trap. In the winter time it saves the trap by forcing the water out of it. It acts as a plug so that any quantity of water can be retained in the sink if desired. The plunger can be readily removed and pipes flushed with hot or cold water or disinfected if required. It occupies a position between the water line in the trap and the sink and cleans where heretofore there has always been a nauseating disease-breeding nest of germs. Mr. Kosiol is anxious to secure agents among the plumbers and invites correspondence from plumbers who desire to act in that capacity. Please write mentioning "Domestic Engineering," addressing L. Kosiol, 514 Maryland street, Louisville, Ky.

P. Gormly, of Philadelphia, recently placed one of Cooper's Reno closets with Atavic flushing valve in the private residence of Mr. Geo. Nass, a large lumber merchant of that city.—Adv.

Frost Proof Closets.

Now is the time when plumbers must be looking out for a frost proof closet for the winter trade. We show herewith the Walls & Pearsall for outside locations. It can be used where other closets would freeze. They will not freeze in zero weather. The tank contains no ball cock or washers, has no chain or pull, is simple in construction, cheap and durable. There is no water in this closet



above the frost line and the closet is given an automatic flush to each using. In order to keep the hopper and pipes damp and prevent any substance adhering to it, a small quantity is discharged before using the closet. Walls & Pearsall are the manufacturers at 305-307 N. Twelfth street, Philadelphia, Pa. They handle a full line of plumbers' supplies and specialties as well as manufacture this closet which has been on the market for about one year during which time they have sold many outfits which have given

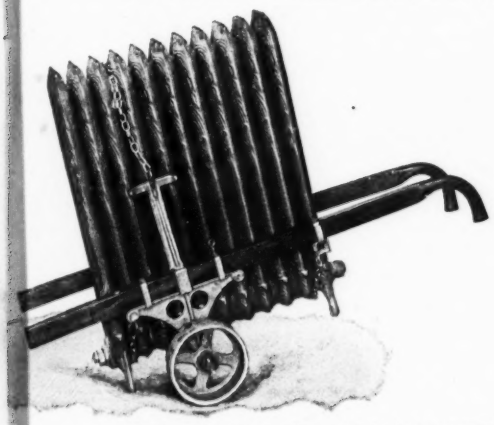
universal satisfaction in every respect. A plumber in Lancaster, Pa., has used eight outfits. They have sent it as far south as Virginia and have sold many in New York and it has been placed all over the state of Pennsylvania. They have never known of the tank being frozen in any case. One outfit which particularly came under the observation of the manufacturers was placed in the yard of a Philadelphia tavern where it was practically out of doors, and during the severest weather of the winter the cold never injured the working quality. The price is very low considering the quality of goods offered. They will be pleased to mail price and description upon application mentioning "Domestic Engineering."

Mantle Chemicals.

To manufacturers of incandescent gas mantles the Roessler-Hasslacher Chemical Co. of 100 William street, New York City, offer special inducements. They make a specialty of carrying very fine high grade chemicals for this purpose and invite correspondence.

A Radiator Truck.

The season of steam and hot water fitting is now on and contractors should secure from C. V. Hill & Co., Trenton, N. J., one of these radiator trucks which is a great labor-saving device for the handling of radiators. Incidentally it may be



stated it is perfectly adapted for handling baths, marble or glass. The wheels are furnished with rubber tires and the handles are made so as to permit of carrying the article up or down stairs without marring the woodwork or walls. Upon application mentioning "Domestic Engineering" a circular describing this more particularly will be sent.

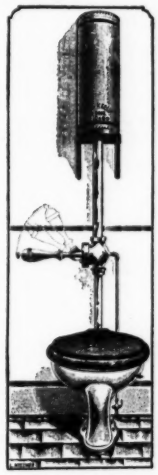
Hermann Plumbers' Woodwork.

In eastern territory there is perhaps no firm better known as manufacturers of plumbers' woodwork than the Hermann Furniture & Plumbers' Cabinet Works, 368-370 Broome street, New York City. They have a new finish which they are calling the attention of the trade to known as the "Golden Oak" and we would suggest that a sample of this finish be had by the trade.

Iowa Plg. & Htg. Co., Davenport, Ia., is setting one of Cooper's Nautilus closets in some work they have on hand.—Adv.

The Quadruplex Closet Valve.

This illustration shows a water closet fitted with the Kelly quadruplex valve which is an air chamber and periodical flush, a handle lift or a chain pull combined in one. It gives in fact an auxiliary water works at home and the size of the feed pipe makes no difference with the water flush. It gives the same pressure as you have at your water works



and the effect is the same as if an independent 1¼ inch pipe ran from the city main direct to each water closet. It cannot hammer, pound or rattle at any pressure. The valve will be sold by itself or in connection with the well known Kelly closets. Upon application to Kelly Bros., 76-82 Jackson boulevard, Chicago, Ill., a circular describing this new device will be sent if you mention "Domestic Engineering."

Lawson's Water Heater.

This illustration shows Lawson's gas water heater, an efficient, economical and compact heater which can be readily attached to an ordinary range boiler at a

very small cost. It is made in three sizes for varying necessities and upon application to L. S. Lawson, 222 Eighth Ave., Homestead, Pa., a circular will be sent.

A Great Business.

Established in 1842, incorporated in 1872, and in 1900 one of the few very large concerns in the United States manufacturing tools and supplies for plumbers, gas and steam fitters, is the Walworth Mfg. Co., of 128-136 Federal street, Boston, Mass. Among the specialties made by this house we may mention Hall's brass pipe wrench which has a grip that grasps without marring the pipe; Hall's pipe reamer which removes the burrs from ends of pipes; Hall's cast iron pipe cutters, made in three sizes which make a smooth even cut in or out of the trench in one-tenth of the time required by hammer and chisel; Hall's tapping machine for street mains, a light strong and durable machine good for any reasonable pressure; Miller's reversible ratchet die plates, especially adapted for threading wrought iron pipes in cramped positions, as in trenches or in corners where lack of space prevents the use of ordinary tools of this class; Walworth's die plates with Hall's solid pipe dies in sizes from ⅛ to 3 inches. These are but a few of the specialties manufactured by this great house, whose catalogue will be sent to the trade upon application mentioning "Domestic Engineering."

Carey & Bro., Media, Pa., have some repair work on hand in which they are using one of Cooper's Reno closets.—Adv.

A New Boiler.

The illustration which we show herewith is the new Furman sectional boiler which, as will be seen from the illustration, shows several new features. It is made in nineteen sizes for steam and hot water and has a capacity of from 350 to

4,000 square feet of radiating surface. A new catalogue has just been issued which will be sent free upon request to the Herendeen Mfg. Co., Department "D," Geneva, N. Y., if you mention "Domestic Engineering."

Denver Plumbing & Chandelier Co., of Denver, have some work on hand in which they are using two of Cooper's Nautilus closets.—Adv.

A Well Known Patent Attorney.

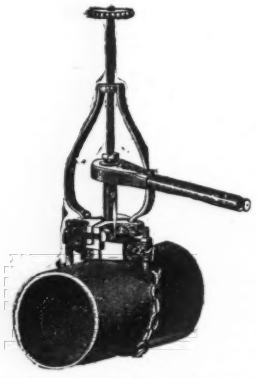
Oscar A. Michel, 302 Broadway, New York City, is in position to secure trade marks, copyrights and domestic and foreign patents, at particularly moderate rates. He has had over fifteen years' experience and has some special connections which are of use to the patentees. If you are contemplating taking out a patent, you should write him.

To Get That Patent.

Among competent lawyers located right on the ground in Washington is the firm of W. T. Fitzgerald & Co., whose office is at the corner of Eighth and "F" streets. Correspondence with them mentioning "Domestic Engineering," will receive attention and they are in splendid condition to take care of this particular line of patent work.

The Hadesty Tapping Machine.

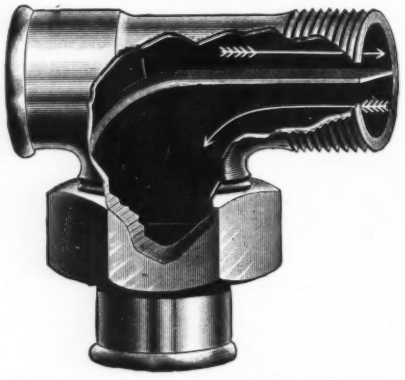
This illustration shows the Hadesty improved tapping machine for tapping water and gas mains against pressure. It will tap mains from three to thirty inches in diameter and does not require differ-



ent saddles for different sized mains. With it a boy twelve years old can make a connection in fifteen minutes. It is manufactured by J. M. Hadesty & Son of Tamaqua, Pa., who will send a circular upon application mentioning "Domestic Engineering."

The One End Fitting.

In this little device the American Plumbers' Supply Co., 76-80 Pratt street, Chicago, Ill., have an article which hot water fitters will very much appreciate. The sectional illustration shows the flow to the radiator and the return from the



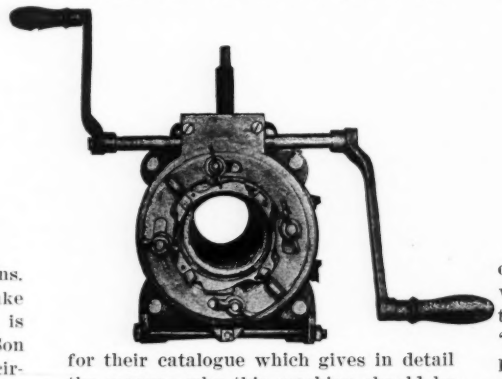
radiator, and it will be seen that it avoids the necessity of extending the return pipe to the further end of hot water radiators. It makes a very neat job as well as being cheap in its cost. The catalogue, which is by the way one of the most beautiful catalogues published, will be sent upon application mentioning "Domestic Engineering."

Lighting Dark Rooms.

I. P. Frink, 551 Pearl street, New York City, does nothing but make reflectors. For years he has done nothing but make reflectors and it is reasonable to suppose that in all that time he has had some valuable experience which should make his reflectors better than those made by people who have just begun the manufacture of this class of goods. Any master plumber who has a proposition on hand which requires the use of reflectors should write to I. P. Frink and get catalogue and prices.

A Vise and Thread Cutter Combined.

The Hickman-Melhorn Co., 200-208 Liberty avenue, Pittsburg, Pa., are makers of this combined vise and screw cutting machine of which we show an illustration. It has so many advantages that we know the trade will be glad to send



for their catalogue which gives in detail the reasons why this machine should be purchased.

The Name of Maddock.

In the sanitary pottery business no name is better known than that of "Maddock." The firm of Thos. Maddock & Sons, Trenton, N. J., has assisted materially in bringing about this condition. There is nothing in the line of sanitary earthenware which they do not manufacture and of some lines they make a distinct specialty, for example, of fine china articles for metal mountings, scalp marks and china articles of every description. Upon application, mentioning "Domestic Engineering," they will be pleased to send samples to the members of the trade who are contemplating the manufacture of these goods.

Taking the Public into Confidence.

The Thomson Meter Co., of 79 Washington street, Brooklyn, N. Y., takes the public into its confidence and announces the exact number of water meters which they have sold. On December 8, 1899, they stamped meter number 150,000; during the year 1899 they sold 25,145 meters and in 1900 up to September 1 they had sold 16,734 meters. They stamp their meters only as they are sold.

A Well Known Gas Fixture House.

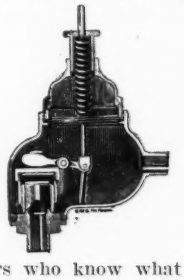
The Thackara Mfg. Co., 1606 Chestnut street, Philadelphia, Pa., is one of the oldest gas fixture manufacturing houses in the United States and master plumbers who desire to carry a line of gas fixtures or freshen up the line already carried should write them and ask for their catalogue which will be sent by mentioning "Domestic Engineering."

Plumbers' Brass Work.

Among recent manufacturers of plumbers' brass work who have placed upon the market a complete line is the Crescent Mfg. Co. of Connellsville, Pa., whose New York office is at 35 Park Row, New York City. They are making just now a special push on traps and their prices on these as well as their brass goods, are said to be exceptionally good.

The G. McG. Regulator.

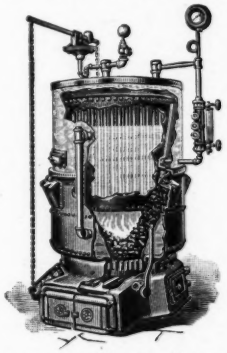
This illustration describes the G. McG. regulator manufactured by the G. McG. Mfg. Co., 115 Christian St., Philadelphia, Pa. This company is made up



of plumbers who know what the trade wants and are endeavoring to give it them. Upon application, mentioning "Domestic Engineering," they will be pleased to send price list of this and of their hopper valve and urinal spray.

The Gorton Side Feed Boilers.

The Gorton & Lidgerwood Co., 96 Liberty street, New York City, manufacture these boilers for steam and hot water heating, for hard and soft coal. The illustration we show is for hard coal and being sectional it shows the material construction of this excellent boiler which has demonstrated its satisfactory quali-



ties in so many hundreds of cases. Upon application mentioning "Domestic Engineering" catalogue and book on "Modern House Heating" will be sent.

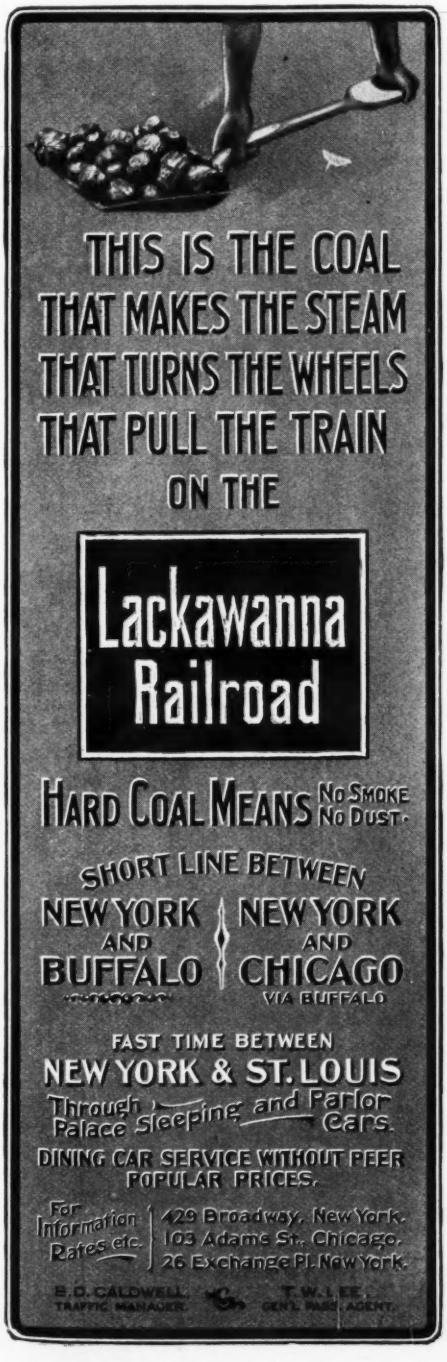
Earthenware Specialties.

Among the plumbing trade of the country there are many master plumbers who are looking about for manufacturers of inventions in sanitary specialties. The Bellmark Pottery Co., of Trenton, N. J.,

is in position to make prices on this class of work and would welcome correspondence from those looking for a manufacturer of this line of goods.

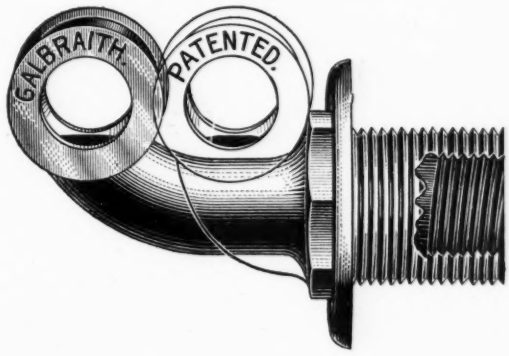
THE TYDEN FILTER.

Among the filters which have become very well known to the trade is the one known as the "Tyden." It is not a cheap filter, but when a plumber sells it he may know he has sold something which will give satisfaction. A catalogue will be sent upon request if you write to the Metropolitan Filter Co., 90 Washington St., Chicago, Ill., mentioning "Domestic Engineering."



GALBRAITH WASH TRAY SPECIALTY.

This illustration shows the Galbraith wash tray fitting for wash trays having openings for faucets very near to the top of the tubs. Its use prevents sediment collecting in the pipes. It is made of brass and galvanized iron and is used by economical plumbers everywhere and recommends itself to every plumber who desires to make good looking work as well as economical work. Upon application to Galbraith & Co., Plainfield, N. J., mentioning "Domestic Engineering," prices will be sent.



THE GEM BOILERS.

The illustration shows the Gem boilers made for hot water or steam by Abendroth Bros., Port Chester, N. Y. The boiler is easily and quickly set up and the capacity is guaranteed. An illustrated catalogue, showing various styles of these heaters together with their vertical sectional heaters for steam and hot water will be sent upon application, mentioning "Domestic Engineering."

THE HOLLAND RADIATORS.

The Holland Radiator Co., 38 Dearborn St., Chicago, Ill., is constantly making efforts to improve its connections with the steam and hot water trade. They now have in addition to their Chicago office a Denver office at 1759 Stout St., an agency in Kansas City and also one in Cleveland, Ohio. At all these points, as well as at their works at Bremen, Ind., complete lines of the Bremen Reliance, Eclipse and Unique radiators are found.

HOW THE UTILITY COMBINATION WORKS.

The Standard Steam Specialty Company, 111 Fifth Ave., New York, N. Y., in 1897 installed one of their 300 H. P. "Utility" exhaust mufflers, oil separator, return tank and pump governor for the American Tobacco Co., New York, and before the heating season was over received an order for a 500 H. P. for the same company for their Richmond, Va., plant. The saving in coal and water in both plants was very satisfactory. At the Richmond plant they have about 35,000 sq. ft. of heating surface and 20,000 sq. ft. in four tobacco drying machines and are doing the entire work with exhaust steam and returning all water of condensation to the boilers practically pure.

CUTS FOR YOUR CATALOGUE.

In these days of perfect engraving it is almost necessary for manufacturers to have perfect illustrations for their catalogue work. Among the engraving companies using "Domestic Engineering" as an advertising medium and whose plates have been seen in these columns during the past year in great numbers, is the American Process Engraving Co., of Cincinnati, O., a company which, as we can bear witness, is thoroughly qualified and equipped to take care of the largest orders in the shortest possible space of time and turn out good work. Upon application to them, mentioning "Domestic Engineering," samples may be had and prices will be quoted.

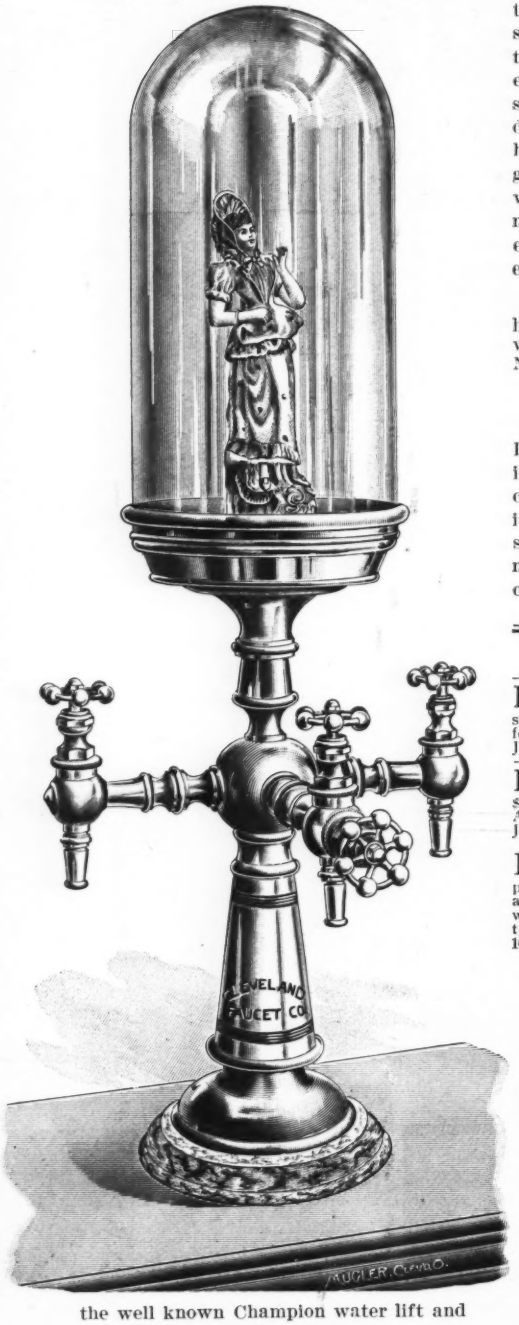
THE COLEMAN GAS MACHINE.

The illustration accompanying this notice shows a portion of the Coleman acetylene gas machine when connected with its improved underground generator. This, in the opinion of manufacturers, makes a perfect invention, being safe, odorless and automatic. Upon application, mentioning "Domestic Engineering," catalogue will be sent.

A THREE ARM SODA DRAUGHT.

This new three-arm soda draught with fountain globe top is made by the Cleveland Faucet Company, 15-27 Frankfort

street, Cleveland, O., with branch offices in New York, Chicago and San Francisco. This company, who are manufacturers of



the well known Champion water lift and Champion hydraulic beer pump, are increasing their line of soda draught arms, and this illustration is one of the designs they have placed on the market this year. It will be noticed that the standard has two single stream faucets, through which the different kinds of mineral waters can be drawn, and a double stream soda draught for cream soda. The draught arm has a marble base and is heavily silver plated. The fountain globe is eight inches in diameter, and various styles of statuettes can be furnished. Further information will be given upon application to the manufacturers.

McKinley & Northwood, Ottawa, Ont., have some work on hand in that city in which they are using several of Cooper's Nautilus closets.—Adv.

IS A GOOD ONE.

The Standard Steam Specialty Co., 111 Fifth avenue, New York City, are meeting with unqualified success among architects and engineers, owing to the merits of their "Utility" exhaust muffler, oil separator, return tank and pump governor. Descriptive matter and catalogue on application.

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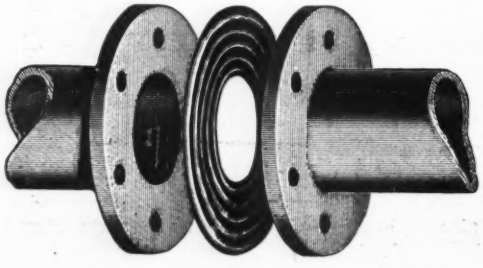

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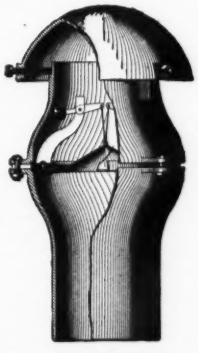

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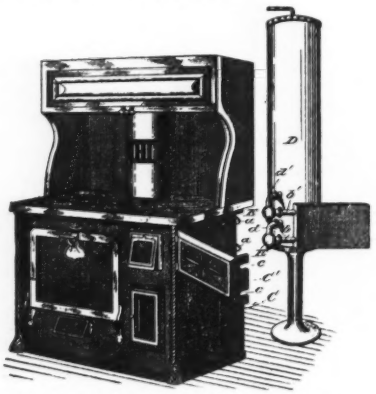
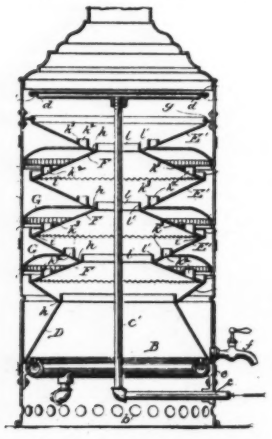
Robert E. Henderson & Co., of Philadelphia, recently placed one of Cooper's closets and Special baths in the residence of C. J. Miller, on North Eighteenth street.—Adv.

656,687—Water back for stoves or ranges, W. J. Wood, Atlanta, Go.



Stinson, Kennedy & Co., of Pittsburg, recently set one of Cooper's low-down Nautilus closets in a large private residence in that city.—Adv.

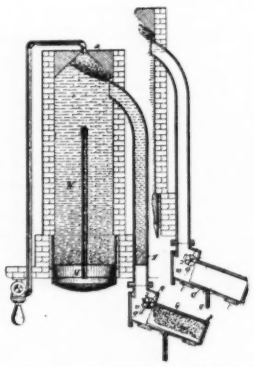
656,813—Instantaneous water heater, M. I. Cohen, Chicago, Ill.



St. John & Barnes, of Colorado Springs, recently installed one of Cooper's low-down Nautilus closets in some work they have on hand.—Adv.

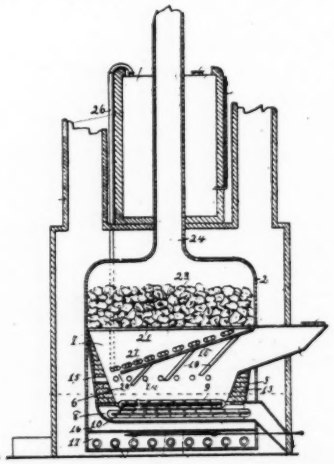
Innes Bros., of Philadelphia, are just completing the plumbing of the Thorn Building, in that city, in which Cooper's closets, urinals and other fixtures were used exclusively.—Adv.

656,863 and 864—Process of making acetylene gas, E. S. Titus, Hempstead, N. Y.



Barr Bros., Rochester, N. Y., have some repair work on hand in which they are using one of Cooper's Nautilus closets.—Adv.

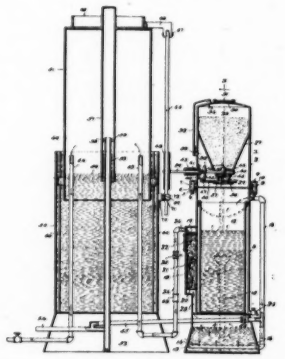
657,131—Hot-air furnace, C. Olsted, Lawrence, Kan.



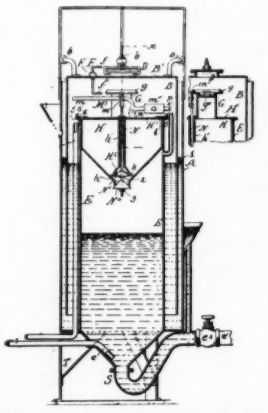
Wm. L. Owens, Narberth, Pa., recently set one of Cooper's Nautilus closets in a nice house at that place.—Adv.

M. J. O'Neill, St. Paul, Minn., has just placed two of Cooper's Reno closets in a building in that city.—Adv.

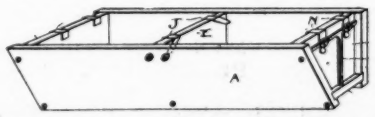
657,150—Acetylene gas generator, J. E. Wormald, Spokane, Wash.



657,209—Acetylene gas generator, G. A. Blauvelt, Nyack, N. Y.



657,308—Stationary washtub for laundries, E. C. Brunner, Cleveland, Ohio.



John Adam Walker, Elmira, N. Y., is using one of Cooper's Reno closets in some work they have on hand.—Adv.

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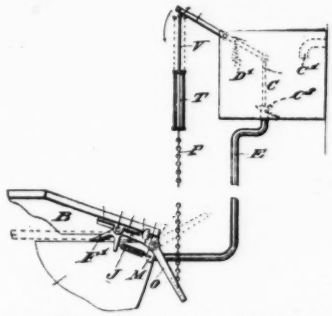
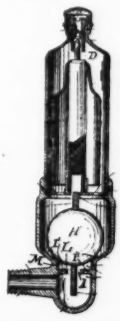
BOX **987**, SCRANTON, PA.

657,278—Automatic flushing apparatus, A. W. Barton, New York, N. Y.



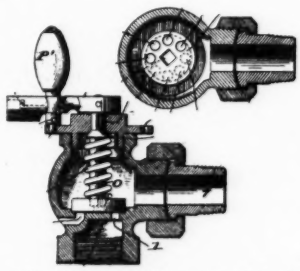
Dean Bros., Dorchester, Mass., recently renovated the plumbing of a large house in that city, using Cooper's fixtures exclusively.—Adv.

656,746—Combined air water and check valve. D. F. Morgan, Chicago.



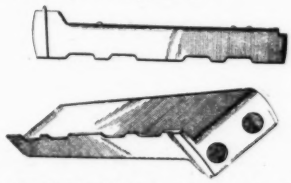
Isaac T. Hirst, of Philadelphia, is plumbing the private residence of Mrs. Wagner, in that city, using Cooper's Nautilus closets, Special baths, lavatories and other fixtures.—Adv.

657,059—Valve. Albert P. Broomell, York, Pa.



John C. Gunger, Chestnut Hill, Philadelphia, recently set one of Cooper's Reno closets in the residence of Mr. Butterworth, at Chestnut Hill.—Adv.

33,148—Water front for stoves. Jafew S. Van Buren, Albany, N. Y.



J. Fred Wohlschlagel, Overbrook, Philadelphia, is plumbing the new residence of Mr. Bradley, of the American Dredging Co., at Camden, N. J., in which he is using four of Cooper's Reno closets, Special baths, lavatories, slop sink, kitchen sinks, wash-trays, etc., throughout.—Adv.

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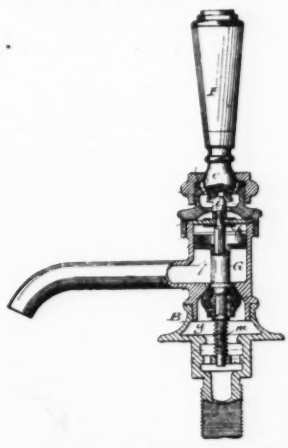
Britton & Shaw, Germantown, Philadelphia, are plumbing the private residence of Mr. Chas. Aichle, on North Fifth street, that city, using Cooper Brass Works' fixtures throughout.—Adv.

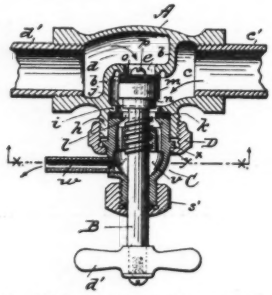
657,107—Faucet. Michael J. Hannifin and Albert Huck, Milwaukee, Wis.



A. L. Hersum, of Boston, is plumbing the new residence of Mr. A. J. Russell, at Kendall Green, using Cooper's Nautilus closets, Special baths, lavatories, etc.—Adv.

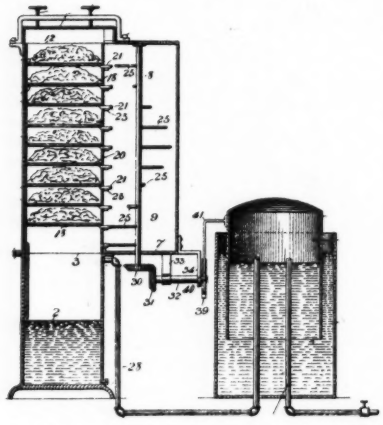
Ames & Bradford, of Boston, are renovating the bathroom in a fine residence in Quincy, Mass., using Cooper's Special baths, lavatories, etc.—Adv.

657,319—Stop and waste cock, W. H. Rowe, Pawtucket, R. I.



657,562—Wall hydrant. Horace F. Neumeyer, Macungie, Pa.

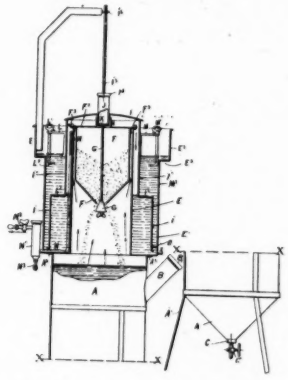
657,549—Acetylene gas generator, A. L. Kiff, Corning, N. Y.



B. F. Roche, Malden, Mass., is doing the plumbing in the extension of the banking rooms of Kidder, Peabody & Co., Boston, using Cooper's Nautilus closets.—Adv.

Herbert Manning, of Philadelphia, recently renovated the plumbing in the house of Mr. Chas. S. Heller, of that city, using Cooper's closets, etc.—Adv.

657,663—Acetylene gas generator, E. Lartigne, Canderan, France.



John K. Tully, of Boston, is installing one of Cooper's Nautilus closets in a fine residence in that city.—Adv.

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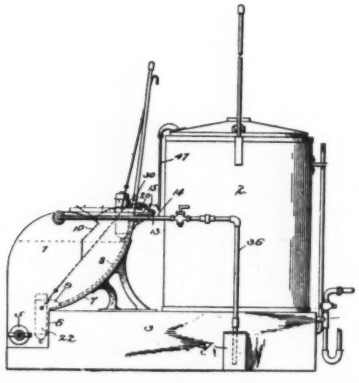
THOMAS MADDOCK & SONS,
TRENTON, N. J.

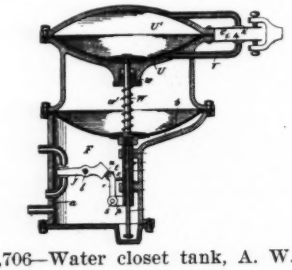
James Shaw, Jr., Providence, R. I., placed one of Cooper's Nautilus closets in a large residence in that city.Adv.

657,364—Acetylene gas generator, W. E. Scofield, Augusta, Ga.

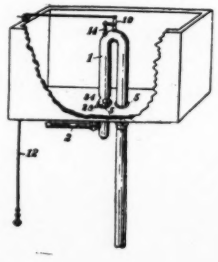


Thomas Oakes & Son, Hartford, Conn., recently set one of Cooper's Nautilus closets in the residence of Dr. E. K. Root, of that city.—Adv.

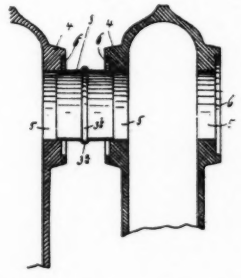
657,677—Automatic temperature regulator. Alfred Roesch, Bridgeport, Conn.



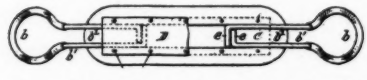
657,706—Water closet tank, A. W. McGahan, Los Gatos, Cal.



657,564—Radiator construction. Charles T. Pratt, Clayville, N. Y.

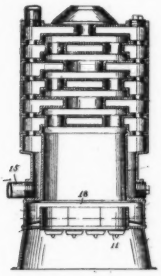


657,640—Bath tub seat. Robert T. Brown, Buffalo, N. Y.



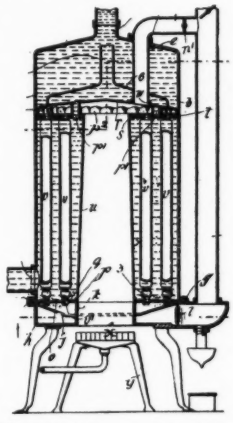
John C. Kelly, of Boston, is plumbing a fine residence for Mr. F. W. Kittredge, of that city, using Cooper's Nautilus closets, Special baths, and other fixtures. —Adv.

657,713—Furnace for heaters. Charles B. Thompson, Chicago, Ill.

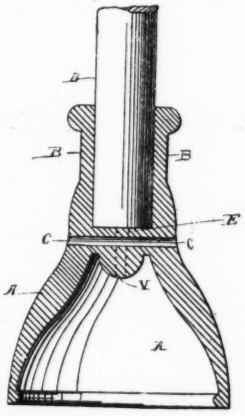


Joseph Geisenberger, of Philadelphia, recently completed a fine bathroom in that city, using Cooper's fixtures.—Adv.

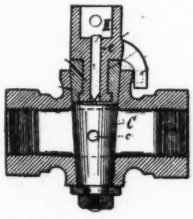
657,794—Water heater. Thomas P. Shaw, Montreal, Canada.



657,858—Flexible waste pipe cleaner. Louis A. Cornelius, Grand Rapids, Mich.

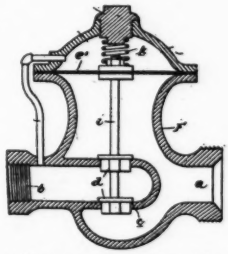


657,895—Stop and waste cock. Emanuel Rickersberg, Cleveland, O.



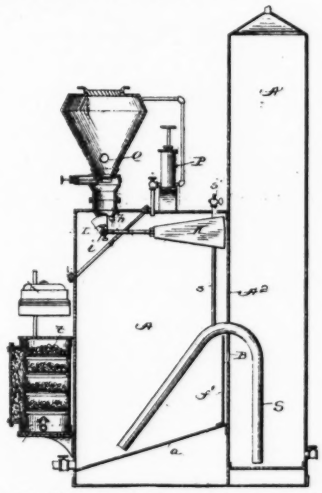
James H. Sullivan, Newton Centre, Mass., is installing one of Cooper's Nautilus closets, Special bath, lavatory, etc., in the house of a prominent citizen at that place.—Adv.

657,891—Fitting for steam heating apparatus. James A. Donnelly, New York.



F. J. Zimmerly & Co., Fort Wayne, Ind., have some nice work on hand in which they are using Cooper's Reno closet.—Adv.

657,957—Acetylene gas generator, H. L. Pyle, Wilmington, Del.

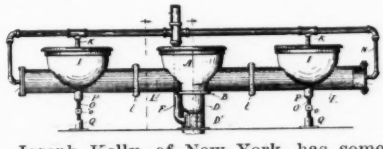


J. H. Stevens & Co., of Cambridge, Mass., have been plumbing an elegant house in that city, using Cooper's Nautilus closets, Special baths, etc.—Adv.

33,203—Heater. George E. Downe, Chicago, Ill.

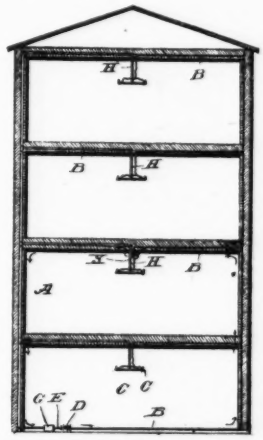
H. P. Blair & Co., of South Bend., is setting one of Cooper's Nautilus closets in the residence of Mr J. M. Studebaker, Sr., of that city.—Adv.

657,989—Water closet, P. J. Madden, Chicago, Ill.



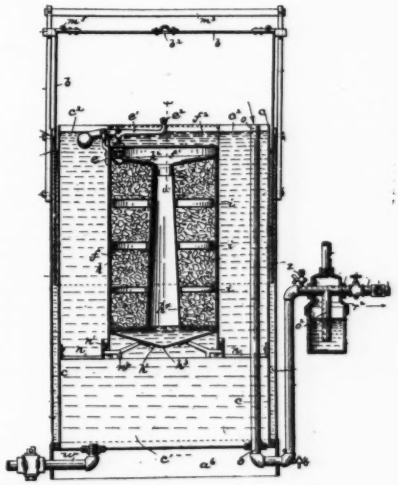
Joseph Kelly, of New York, has some repair work on hand in which he is using one of Cooper's Nautilus closets.—Adv.

658,013—Method of locating concealed water pipes, F. I. Iddings and D. H. Washburn, Washington, D. C.



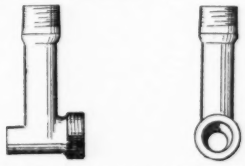
Wm. Owens, Madison, Wis., has some repair work on hand in which he is using one of Cooper's Nautilus closets.—Adv.

658,033—Acetylene gas generator, J. W. Weeks, Providence, R. I.

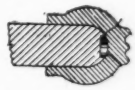


J. J. Hanighen, of Omaha, is plumbing the Chicago, Burlington & Quincy R. R. depot, at Omaha, using twenty-five of Cooper's Nautilus closets.—Adv.

33,179—Pipe coupling. James J. Lawler, Mount Vernon, N. Y.



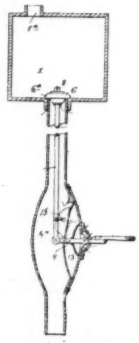
658,084—Bath tub seat, H. L. Grimmell, Buffalo, N. Y.



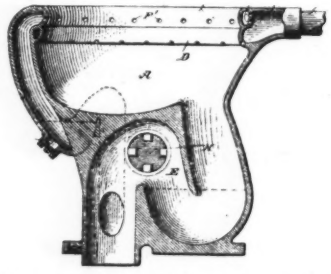
James F. Davlin, Somerville, Mass., has been renovating the bath room of Mr. Wellington, of that city, using Cooper's Nautilus closet.—Adv.

P. Gormly, of Philadelphia, is doing some work at Pottstown, Pa., using Cooper's closets, with Atavic flushing valves.—Adv.

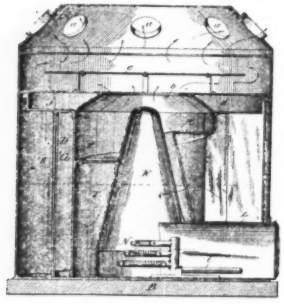
658,161—Water tank, Morris Shapiro, New York city.



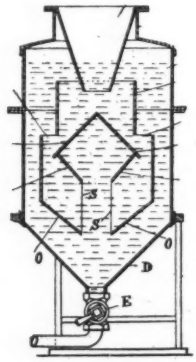
658,222—Water closet bowl, C. Schifflin, New York, N. Y.



657,016—Hot air furnace. George Thomson, Chicago.

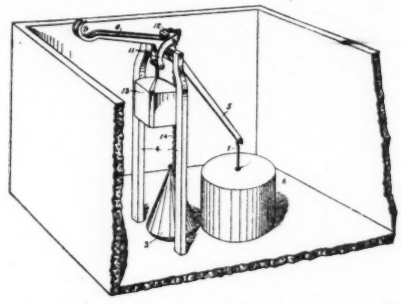


658,264—Acetylene gas generator, A. Husson, Parrentury, Switzerland.

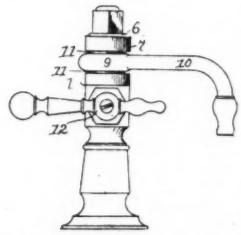


John C. Gunzer, Chestnut Hill, Philadelphia, recently set one of Cooper's Nautilus closets in the private residence of Mr. Samuel Y. Heebner, at Chestnut Hill.—Adv.

658,139—Automatic flusher, I. P. Clarke, Alameda, Cal.



658,252—Right and left basin cock, W. B. Ford, Decatur, Ill.



Iowa Plg. & Htg. Co., of Davenport, Ia., have two large residences on hand, in which they are using two of Cooper's Nautilus closets.—Adv.

New Catalogues Sent Free.

Messrs. Jas. L. Robertson & Sons, of 204 Fulton street, New York City, send us a pamphlet descriptive of their Tic-a-Toc grease cup, an automatic feeder for oiling crank-pins and eccentrics. Free on application to those mentioning "Domestic Engineering."

"Just a Moment" is the pithy heading of a pithy statement of the superiority of the Hahn acetylene gas burner. It is published by J. B. Carroll, 84 Market street, Chicago, and will be sent free on application to those who mention "Domestic Engineering."

Columbian gas stoves and heaters, of the Haberling patent, are shown in a pamphlet issued by the Columbus Brass Co. "Perfection" is the watchword of this company. Those interested may have the catalogue free on application, mentioning "Domestic Engineering."

The Acorn filter is the name given by T. Linke & Co., 1559 Broadway, New York City, to their natural stone water purifier. They will send free, upon application, a pamphlet showing how it may be attached to faucets in a variety of ways. Mention "Domestic Engineering."

The American Blower Co., of Detroit, Mich., has issued a new catalogue, No. 117, telling of its patent dry kilns, an appendix to which deals briefly with the subject of heating and ventilating by the fan system. It will be sent free on application to those mentioning "Domestic Engineering."

The Gurney Heater Manufacturing Co., of 74 Franklin street, Boston, send us a folder setting forth the superior merits of their tank and laundry heaters. Doubtless it will prove of interest to those whose problem it is to heat large quantities of water. To such it will be sent upon application and the mention of "Domestic Engineering."

The Boston National Acetylene Gas Co. send us a pamphlet descriptive and laudatory of their National Wet Process Generator. The machine has a regulator which automatically begins and stops the generation of gas, thus preventing the surplus generation and leakage of gas. Descriptive matter free on application, mentioning "Domestic Engineering."

Architects, plumbers and sanitarians may have free, by mentioning "Domestic Engineering" when writing to the Hunting-Weekes Co., of Watertown, N. Y., their new catalogue of modern sanitary specialties. The catalogue is tasteful in design and handsomely illustrated. It contains matter gratifying to those who believe in progression along sanitary lines.

"Perfect Lighting" is the title of a neat little booklet just received from the Sunlight Gas Machine Co., of 206-208 Greenwich street, New York City. It is designed to do missionary work in the cause of acetylene gas lighting in general and to introduce their "Submarine" gas machine in particular. It will be sent free to those who apply, mentioning "Domestic Engineering."

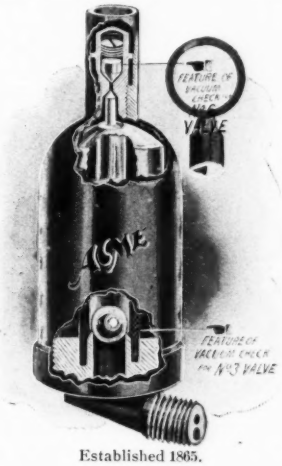
A leaflet which has come to the editor's table tells of the superior advantages of Forbes' Patent Die Stock, manufactured by the Curtis & Curtis Co., of Bridgeport, Conn. This die is particularly recommended for use in trenches and other cramped positions. The leaflet will be sent free upon inquiry, mentioning "Domestic Engineering." See advertisement elsewhere in this issue.

We are in receipt of a circular from the office of the Director General of the Pan-American Exposition, to be held at Buffalo, N. Y., setting forth the purpose of the exposition and its special advantages to those who desire to develop their trade relations throughout the Western hemisphere by means of public exhibits. Those who contemplate exhibiting should write for information and application blanks to Wm. I. Buchanan, Director General, Buffalo.

The Ideal Manufacturing Co., of Detroit, Mich., send us a brace of catalogues of their gas heaters and ranges. The catalogues are quite up to the standard of elegance which marks all the advertising matter of this progressive firm. The maximum of heat for the minimum of gas consumption has been the end of all their experiments, and the catalogues tell of the success obtained. They will be

sent free to those who apply, mentioning "Domestic Engineering."

We have received the L. Wolff Manufacturing Company's general catalogue for 1900—a comprehensive work of over seven hundred pages devoted exclusively to the plumbing goods manufactured and handled by that well known Chicago firm. From a bookmaker's standpoint the new catalogue is a work of art. Substantially bound in dark blue cloth, the cover design in gold is tasteful and pleasing, and prepares one for the display of quiet good taste which marks the book from cover to cover. No expense has been spared to make the catalogue a valuable reference book for the trade. The compiler evidently appreciates the educative influence of pictures, and well-executed half-tones tell the story quite effectually and do away with the tiresome verbiage which often-times bewilders rather than enlightens a prospective buyer. Where description is necessary it is short, crisp and to the point. The opening feature of the catalogue is a telegraphic code for correspondence, comprising in a few symbolic or key words all the phrases which are likely to be used by the customer in enquiring about, ordering or giving instructions for shipping goods, with the firm's answers to the same. This feature must prove a great convenience to the buyer in giving rush orders. An even hundred pages is devoted to the faucet department, in which are shown no less than five hundred and eighty-five varieties of bibbs, stops, cocks and valves. Those of the compression type, of course, predominate, though there is a complete showing of ground and Fuller work, patent ball cocks and self-closing work. Of this last type four different makes of valves are shown and each in considerable variety. The Dougherty and Boston types are perhaps the best known, though the telegraph handle and the Gielow cocks are also popular. Sink and hose specialties, hydrant fittings and service boxes come next in order, and the plumber who cannot find his every want anticipated in these pages must indeed be hard to please. The soil pipe question is introduced by pictures and descriptions of Wolff's testing plug, which is modestly recommended. Then follows an array of pipe—bends, branches, crosses, angles, offsets, increasers and reducers. The subject of traps is next treated at some length, followed by hydrant cesspools and floor drains. Plumbers' tools, with descriptions of the same, takes up a considerable section and remind us that good work cannot be turned out with poor tools. Lavatory, bath room, kitchen and laundry fittings take up the balance of the book, requiring almost five hundred pages for their proper treatment. Lavatories are shown in every degree of finish for the home, the hotel, the hospital, the workshop; lavatories for my lady's boudoir and wash sinks for the black and perspiring foundryman. Marble bowls, porcelain bowls, enameled bowls, Durostone bowls, plain bowls and painted bowls—bowls for all sorts and conditions of men. The same range of fancy is catered to in the matter of bath room fittings. It is needless to say that open plumbing is the order of the day and that the old copper and zinc tubs find their proper place on the very last page. Next time they will be bound outside the cover. But in Wolff's under-roll rim enameled iron baths both the whimsies of the ultra-fastidious and the pocket-book of him who has no choice are considered. Of showers, sprays and needle baths there is a gratifying display. Water closets—both high tank and low down patterns—are duly pictured and their different features briefly described, "Duroware," an earthenware said to be absolutely non-absorbent and impervious to all moisture, is especially recommended. The syphon jet and syphon wash down combinations, together with a full sweep trap are strong features of all their work in this department. Taken all in all the catalogue is a fine example of the liberal methods, tireless energy, and minute attention to detail which have been instrumental in building up an immense business from a small beginning. It is for free distribution among those in the trade who write, mentioning "Domestic Engineering."



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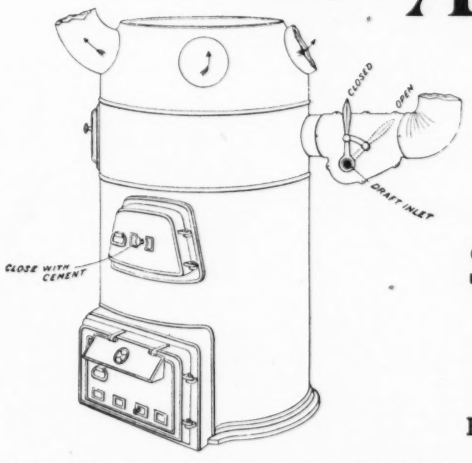

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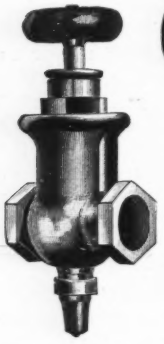

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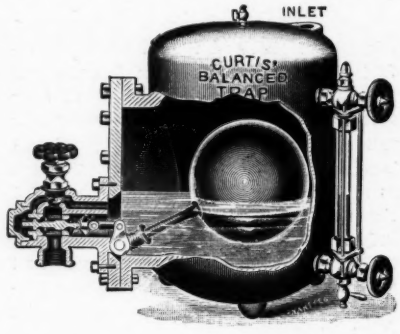

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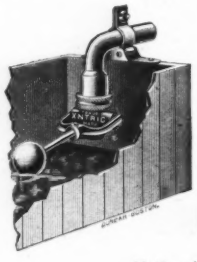

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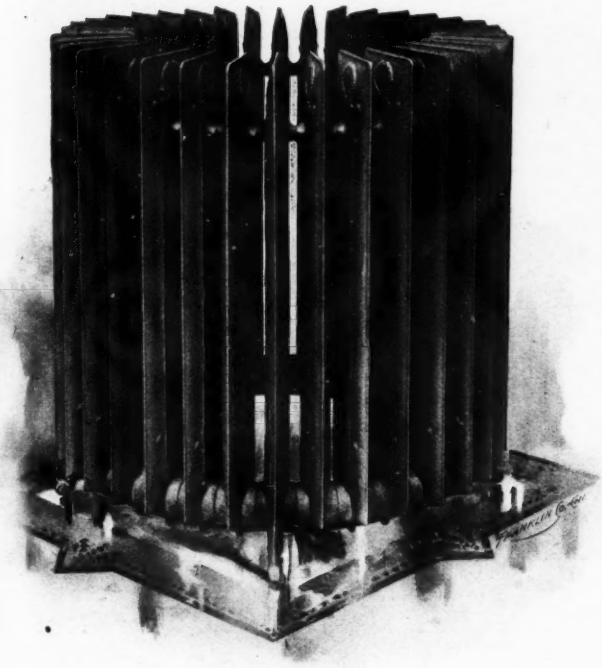

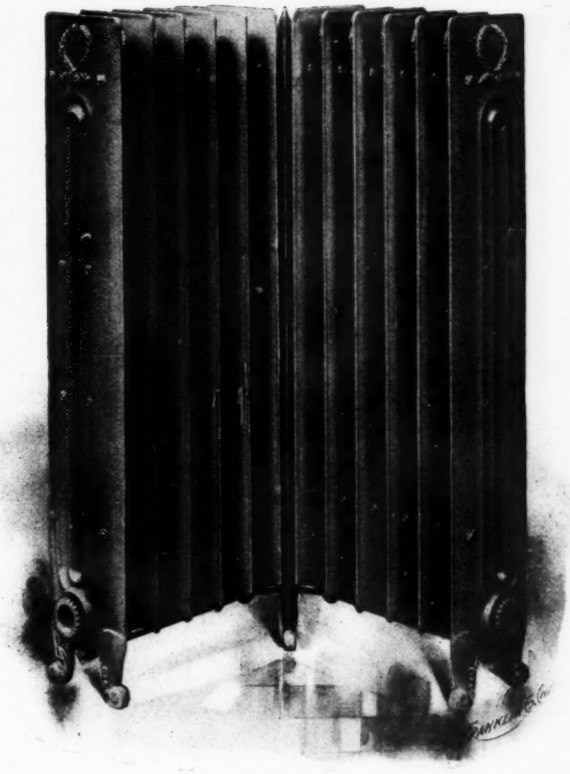

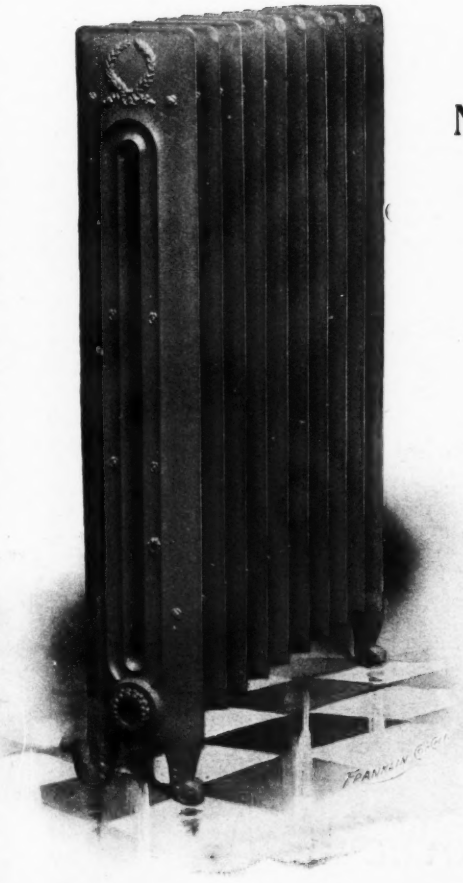

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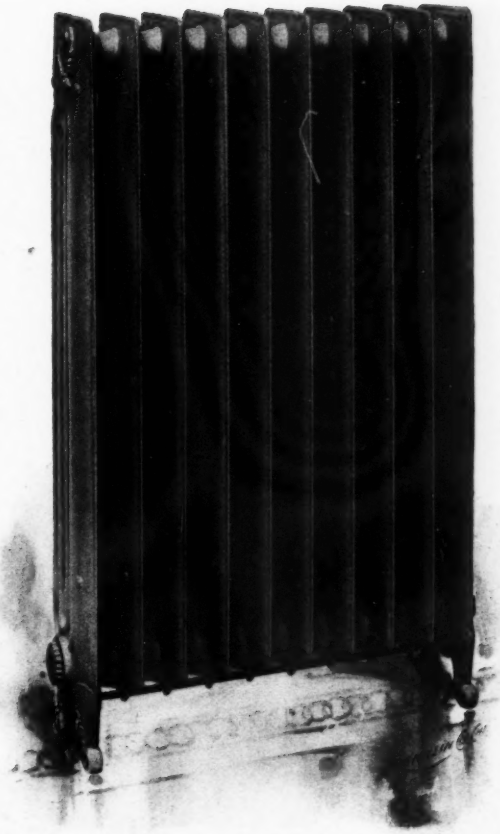

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THOS. T. ECKERT, President and General Manager.

BU 21 K.AY. 20 Paid Govt.

RECEIVED at 131 Genesee Street, Utica, N. Y.

Chicago, Ills. Aug.17/1900.

International Heater Co.,

Utica,N.Y.

You are awarded gold medal at Paris exposition.

J.M.Allen,

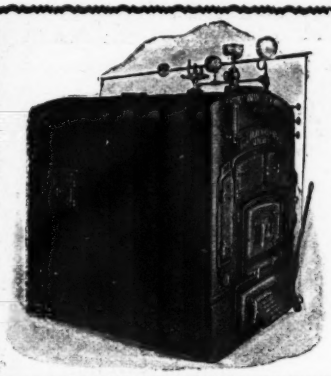
Assistant Director of Affairs in the U.S.

INTERNATIONAL HEATER CO.
UTICA, N.Y.

NEW YORK BOSTON CHICAGO

DENVER MINNEAPOLIS

LARGEST MAKERS OF HEATERS IN THE WORLD



A NEW BOILER

THE FURMAN

New Model Sectional

Combining several new features

Made in 19 sizes for Steam and Hot Water. Capacity from 350 to 4000 sq. ft. radiating surface.

Write for New Catalogue just issued. Sent free upon request.

The Herendeen Mfg. Co.

Dept. D. GENEVA, N.Y.

BRANCHES:

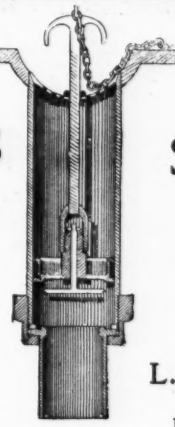
39 Cortland St., - New York

120 High St., - - - Boston

Bloomington, - - - Illinois

Barnacle publications have injured periodical adverting among the inexperienced, but not among the skillful.

Kosiol's Perfected Sink Waste



SEND $2.50 FOR SAMPLE.

L. KOSIOL,

514 2nd St.,

Louisville, Ky.

SEND FOR FREE BOOKLET.

THE TYDEN is the best filter

METROPOLITAN FILTER CO. 97 Washington St. CHICAGO.

Where To Locate?

WHY, IN THE TERRITORY TRAVERSED BY THE

Louisville and Nashville Railroad,

The Great Central Southern Trunkline,

IN

KENTUCKY, TENNESSEE, ALABAMA, MISSISSIPPI, FLORIDA,

WHERE

Farmers, Fruit Growers, Stock Raisers, Manufacturers, Investors, Speculators and Money Lenders

will find the greatest chances in the United States to make "big money" by reason of the abundance and cheapness of

LAND AND FARMS, TIMBER AND STONE, IRON AND COAL, LABOR—EVERYTHING!

Free sites, financial assistance, and freedom from taxation, for the manufacturer.

Land and farms at $1.00 per acre and upwards, and 500,000 acres in West Florida that can be taken gratis under U. S. Homestead laws.

Stockraising in the Gulf Coast District will make enormous profits.

Half fare excursions the first and third Tuesdays of each month.

Let us know what you want, and we will tell you where and how to get it—but don't delay, as the country is filling up rapidly.

Printed matter, maps and all information free.

Address R. J. WEMYSS,

General Immigration and Industrial Agent.

LOUISVILLE, KY.

Cheer up, Jack! Don't be a Lobster!

The Seiben Floor Drains

are the best that ever. They save digging a deep ditch. Calking of joints. Extra fittings. Hours time and grief. No stoppage of sewers. No evaporated trap seal. No back water and need no vent pipe. They are made with or without back water valve. Ask your jobber or write for our new catalogue.

THE SIEBEN MFG. & SUPPLY CO.

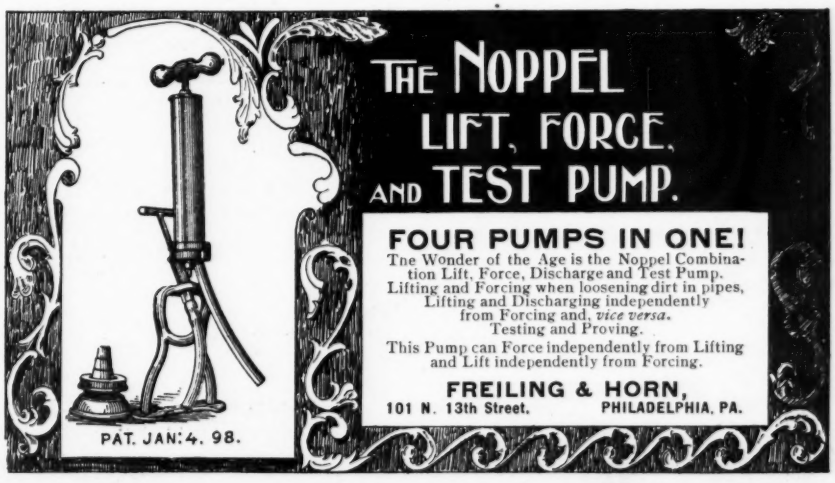
1120 Holmes Street

KANSAS CITY, MO. U. S. A.

Pat. Sept. 24, '95 / Pat. Jan. 4, '98

EVERY PLUMBER

In the United States should have a NOPPEL PUMP


THE NOPPEL LIFT, FORCE, AND TEST PUMP.
FOUR PUMPS IN ONE!
The Wonder of the Age is the Noppel Combination Lift, Force, Discharge and Test Pump.
Lifting and Forcing when loosening dirt in pipes,
Lifting and Discharging independently from Forcing and, vice versa.
Testing and Proving.
This Pump can Force independently from Lifting and Lift independently from Forcing.
FREILING & HORN,
101 N. 13th Street. PHILADELPHIA, PA.
PAT. JAN. 4. 98.

STANDARD BATHS

We believe every plumber and dealer should carefully consider the trade-winning qualities of the line of enameled goods which he carries.

The product of the four leading concerns, composing this company has the reputation of being the best in the world.

These four concerns are:

The Standard Manufacturing Co., Pittsburg.
The Ahrens & Ott Company, Louisville.
Dawes & Myler Works, New Brighton.
Buick & Sherwood Mfg. Co., Detroit.

The high reputation for beauty and durability which these goods have gained has created a strong and permanent demand for them the world over.

The best line of goods for the dealer to handle is that for which there is the greatest demand.

Free catalogues may be obtained at the home office or any of our branch houses.

The Standard Sanitary Mfg. Co.

Pittsburg, Pa.

BRANCH OFFICES:
New York, Philadelphia, Buffalo
Cleveland, Chicago, Montreal

FACTORIES:
Pittsburg, Pa. Louisville, Ky. New Brighton, Pa.
Detroit, Mich. Ellwood City, Pa.

CHARLES AUSTIN BATES N Y

Send Us Your Orders for

Lead Pipe
Sheet Lead
Solder
Lead Traps
Lead Bends
Combination Ferrules and Soldering Nipples
Bi-Metallic Traps, etc.

We guarantee prompt shipment

We guarantee lowest market prices

Sportsman's Shot Works, Cincinnati

McVAY & WALKER
Manufacturers of
Enameled Tubs.

WILL GLADLY SEND PRICES ON THE TWO BEST TUBS MADE.

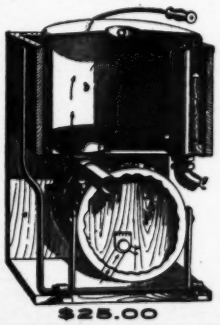
Write Today. *Unique and Eureka* Prices will surprise you.

BRADDOCK, PA.

If you See it in DOMESTIC ENGINEERING it's so. That's what booms the paper.

Thomson's S. P. Smoke Machine

Has no glass gauges to break :: Cannot possibly force a good trap seal



$25.00

SCHENECTADY, N. Y., April 8, 1897.

Gentlemen: In reply to your request in regard to the working of the Thompson's S. P. Smoke Machine furnished by you for the Board of Health of this city, would say that it has proved to be equal to the guarantee made by you to the board.

Very truly yours, JOHN E. HARBINSON,
Inspector of Plumbing.

Write for our booklet, *"How to Test Plumbing"*

Gunster & Forsyth Mfg. Co.

Sole Manufacturers

Sole agents for Massachusetts
Dalton-Ingersoll Company, Boston

Scranton, Pa.

Canadian manufacturers
The Jas. Morrison Bros. Brass Mfg. Co.
97 Adelaide Street, Toronto

For sale by all leading jobbers

"The wisdom of their wisr men shall perish, and the undeestanding of their prudent men shall be hidden"

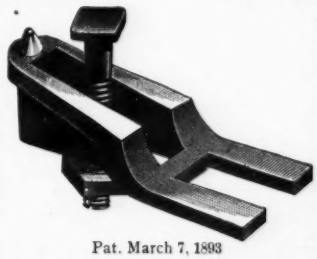
unless you advertise in your own trade paper---

"Domestic Engineering"

because it has a field of its own.

THAT'S WHY Advertisers Get RESULTS

The McVey
Basin Clamp



Pat. March 7, 1893

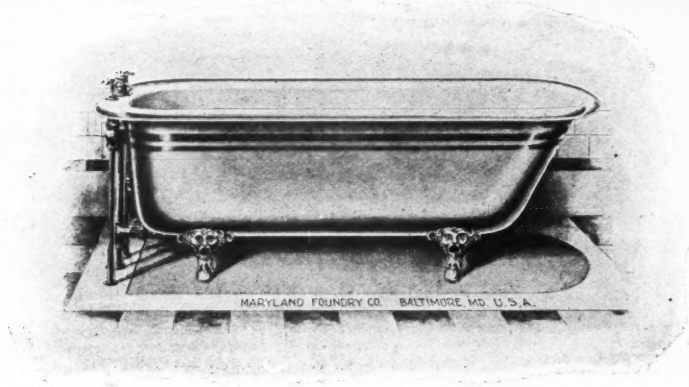
THE CHEAPEST AND BY FAR THE BEST

Made only by

J. M. McVEY

LIMA, OHIO

For Sale by all dealers in Plumbers' Supplies



The "Countess"

Pattern Maryland Enameled Bath is but one of the elegant line of baths made by us for the trade who desire particularly fine goods at the same price as other companies charge for run of foundry goods. Our catalogue shows other styles.

A. Weiskittel & Son
BALTIMORE, MD.

The Yellow Book

of the Plumbing, Gas and Steamfitting Trade. Just corrected to date. The most complete Directory of the Plumbing, Gas and Steamfitting Trade ever published.

Leased at $25.00 Per Year
Including corrections and additions.

DOMESTIC ENGINEERING
Chicago

By Thos. McNeil

THE STEAM AND HOT WATER FITTERS' TEXT BOOK.

140 Pages. Cloth.

TELLS HOW

To Estimate Radiation.
To Plan a Hot Water Job.
Size of Flow and Return Pipes.
One and Two Pipe Steam Work.
Heating with Exhaust Steam.
Blower System of Heating.
Explains Valve Construction.
Explains Steam Traps and Automatic Pump Governors.
Connecting High Pressure Appliances.
Making Wall Miter and Box Coils.
Size of Indirect Stacks.
Making Cost Estimates.
Making Specifications and Contracts.

And Many Other Important Things that Good Workmen Must Know.

ILLUSTRATED.
ONE DOLLAR, POSTPAID.

Domestic Engineering
58-64 N. Jefferson St., Chicago.

OR YOU MIGHT

PUT IT HERE

DROP US A LINE
ABOUT
PLUMBER'S LEAD TRAPS

WE MAKE THEM AND ARE LEADERS IN THE BUSINESS. WE ALSO MAKE LEAD BENDS AND FERRULES.

PRICES AND CATALOGUE UPON APPLICATION.

THE WESTERN BRASS MFG. Co
615-617 WALNUT, ST. - ST. LOUIS, MO

If we will sell you a 350 ft. Water Boiler at $8.10 less than others; a 550 ft. Boiler at $14.00 less, and an 850 ft. Boiler at $19.50 less and guarantee it will do as much or more work than any other other Boiler which has the same size grate, isn't it good business for you to find out about it?

Perhaps you have a strong competitor who gets most of the business in town, on the prestige attached to the name on the Boiler he handles.

If ours is a better Boiler, can't you tell why it is better and sell it on its **real worth**, instead of on the sentiment attached to the name?

Some wide awake dealers have discontinued paying a large price for a manufacturer's name, they have established their **own** name by selling goods on their merits.

The best and most economical advertising is selling the best article for the least money.

You can do a large business with a very small newspaper space if you prove to a few customers your prices are less for a really good article.

Your money back for the asking if our goods are not what you **expected them to be.**

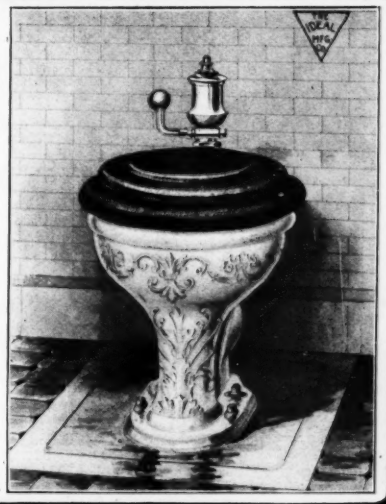
DIGHTON FURNACE COMPANY, TAUNTON, MASS.

THAT

IS THE ONLY PRESSURE REGULATING FLUSH VALVE ON THE MARKET. FLUSHING THE CLOSET WITH THE SAME AMOUNT OF WATER AT EACH OPERATION REGARDLESS OF FLUCTUATIONS IN PRESSURE AT THE MAIN OR SUPPLY WITHOUT ANY ADJUSTMENTS.

Perfectly Automatic Patented

The IDEAL Volumeter



IDEAL MFG. CO. DETROIT MICH.

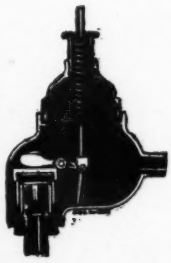
The IDEAL Mfg. Co.

Manufacturers of

Fine Sanitary Specialties

DETROIT MICH.

IDEAL MFG. CO. DETROIT MICH.



The G. McG. Manufacturing Co.

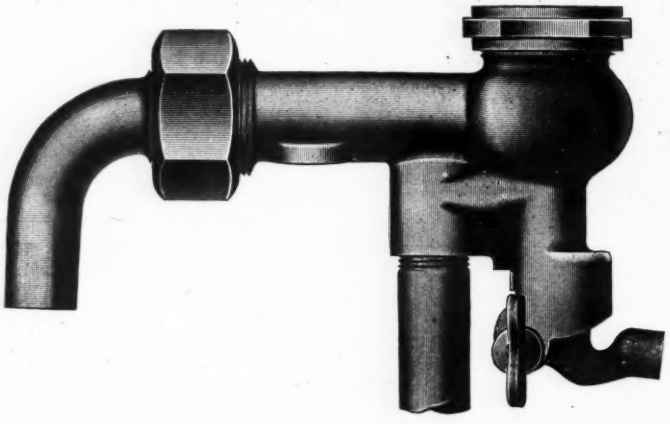
::: Manufacturers and Patentees of the :::

G. McG. REGULATOR, HOPPER VALVE AND URINAL SPRAY

W. U. GRIFFITHS
A. McGUCKIN

No. 1015 Christian Street
PHILADELPHIA PA.

The Problem Solved



THE

DUPLEX Ball Cock

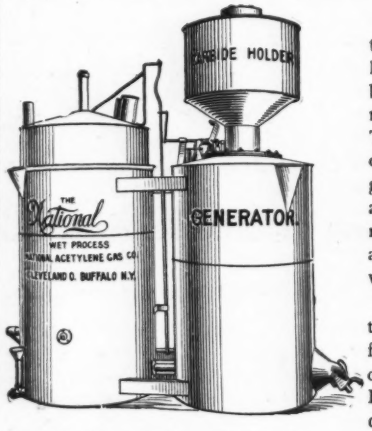
A Postal will bring you Price List and Discounts

GUARANTEED TO OPERATE ON ANY PRESSURE FROM ONE POUND TO THREE HUNDRED POUNDS
MADE FOR TOP, BOTTOM AND END SUPPLY. *FOURTEEN SIZES AND STYLES*

F. W. WEBB MANUF'NG CO.

52 to 60 Elm St., 2 to 24 Friend St., BOSTON, MASS.

The New National



The only machine on the market which can be loaded with enough carbide to run 30 days or more without recharging. The only machine which does not produce after-generation when lights are turned off. The only machine which does not allow the gas to escape while recharging.

The carbide is fed into the water in a granulated form, thereby insuring cool, pure gas at all times. By our process of purification we are enabled to use Acetylene gas for cooking and running gas engines. The new National is fully approved by all the Boards of Fire Underwriters throughout the United States. **Local and General Agents Wanted**

Boston National Acetylene Gas Co.

17 State Street, Boston, Mass.

Patent Applied for.

The Walls & Pearsall

Anti-Freezing Closet

For Outside Locations

Can be used where other closets would freeze. Perfectly frost proof in zero weather.

The tank contains no ball or cock washers, has no chain or pull, is simple in construction, cheap and durable. No water above frost line. An automatic flush after each using.

A small quantity of water is discharged before each using, in order to keep Hopper damp and prevent any substance adhering.

WALLS & PEARSALL

305-307 N. Twelfth St. PHILADELPHIA, PA.

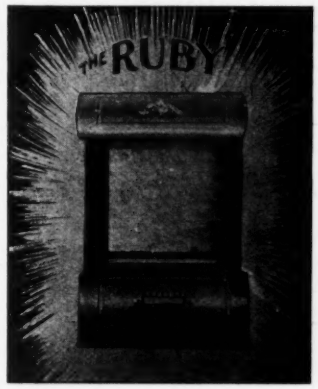
Baldwin's

Last and best work on Hot Water Heating

Hot Water Heating and Fitting, or Warming Buildings by Hot Water. A description of Modern Hot Water Heating Apparatus; the Methods of their Construction and the Principles Involved. By Wm. J. Baldwin, A.M., M.E. 3d ed. Ill. 8vo, cl. New York, 1891. **$4.00.** Sent postpaid on receipt of price.

Domestic Engineering

CHICAGO



The Ruby

Gas Heater is 30 per cent cheaper than the cheapest

It is not as fancy as some others, but is guaranteed as good in every way, and you can buy it at a price that will secure the business. Only one room in a few houses requires a fancy heater and all the remainder want a plain durable stove. **Write for prices and Cat.**

Central Supply Co., Columbus, O.

Very Useful!

DOMESTIC ENGINEERING'S JOBBERS' LIST.

Now Ready. Price, $5.00.

A complete compendium of all legitimate Jobbers in Plumbing Gas and Steafimtting Supplies in the United States; their address, line of goods carried and names of buyers.

DOMESTIC ENGINEERING,
58-64 N. Jefferson Street, Chicago.

Strength

In a Stop and Waste is the one quality most requisite. The Ohio is made only of the best metal and with the best of workmanship possible to employ. They are strongest where strength is most needed. Write for catalogue.

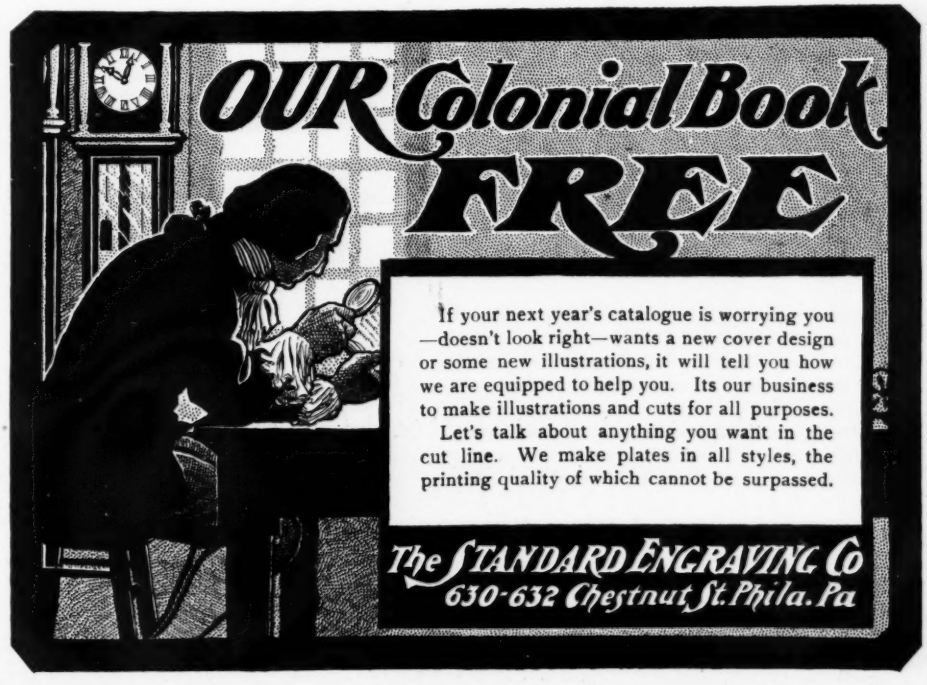
The Ohio Brass & Iron Mfg. Co., Cleveland, Ohio

THE JOBBER'S DIRECTORY

a book which every Master Plumber should have.

Price, $5.00

DOMESTIC ENGINEERING
58-64 N. Jefferson St., Chicago.


OUR Colonial Book FREE
If your next year's catalogue is worrying you —doesn't look right—wants a new cover design or some new illustrations, it will tell you how we are equipped to help you. Its our business to make illustrations and cuts for all purposes.
Let's talk about anything you want in the cut line. We make plates in all styles, the printing quality of which cannot be surpassed.
The STANDARD ENGRAVING Co
630-632 Chestnut St. Phila. Pa

INSTANTANEOUS WATER HEATERS are now a recognized necessity in every bath room—that means the

Humphrey

Crescent Instantaneous Water Heaters

of course

No house complete without this most perfect device

Price, Nickel Plated,

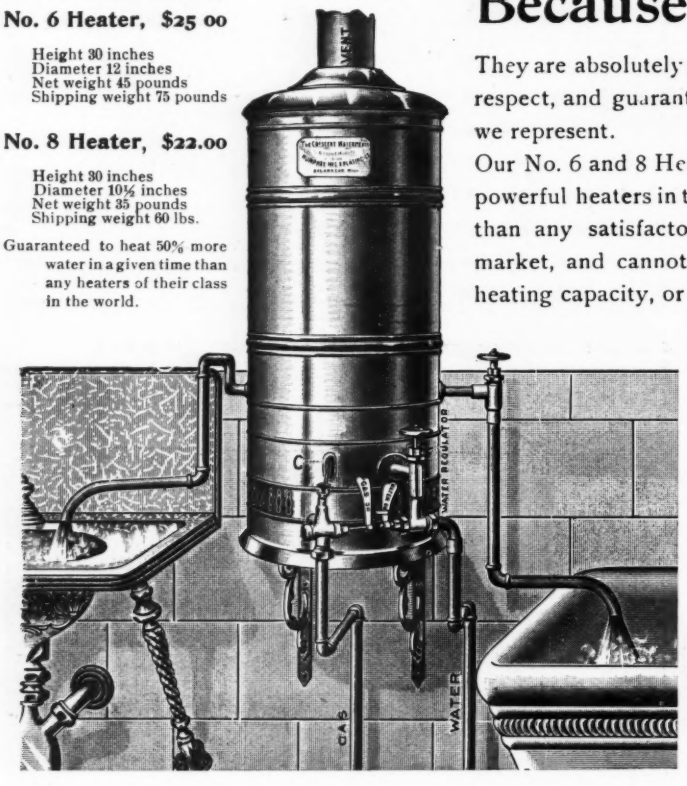
No. 6 Heater, $25 00

Height 30 inches
Diameter 12 inches
Net weight 45 pounds
Shipping weight 75 pounds

No. 8 Heater, $22.00

Height 30 inches
Diameter 10½ inches
Net weight 35 pounds
Shipping weight 60 lbs.

Guaranteed to heat 50% more water in a given time than any heaters of their class in the world.



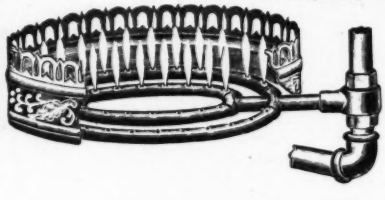
No. 6

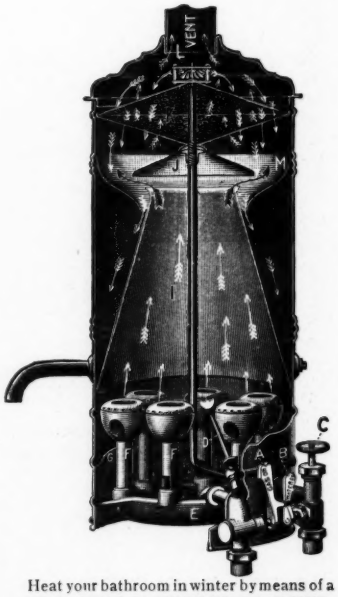
Because

They are absolutely uncqualled in every respect, and guaranteed to be all that we represent.

Our No. 6 and 8 Heaters are the most powerful heaters in the world. Cost less than any satisfactory Heaters in the market, and cannot be approached in heating capacity, or in any way.

one cent buys a bath





Heat your bathroom in winter by means of a **CRESCENT BATHROOM WARMER.** This simple device is connected without extra pipe beneath the heater shelf, and is out of the way when not in use. By merely pulling out into the room, the gas supply is opened and burner can be lighted. An inexpensive luxury and neccessity.

Price Nickel Plated $3 00

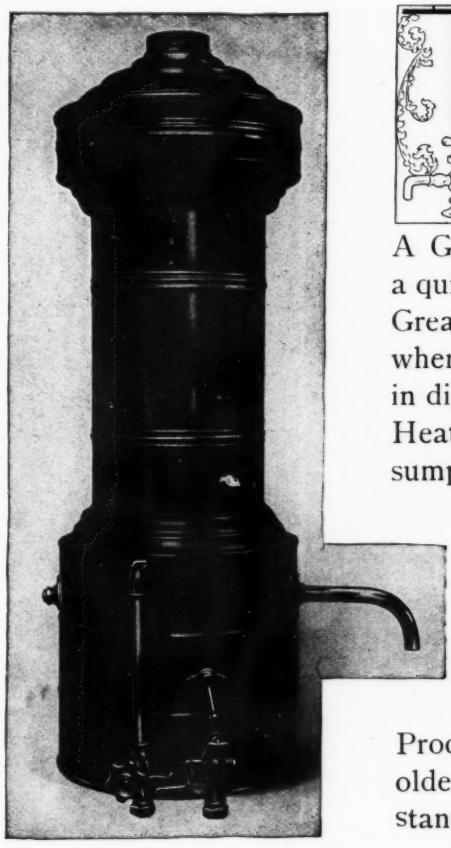
Write for our handsomely illustrated booklet and catalogue **"How the Millions Have Bathed,"** dedicated to the Great Washed, and sent free upon application to

The Humphrey Mfg. and Plating Company

KALAMAZOO, MICH., U. S. A.

THE INSTANTANEOUS WATER HEATER OF TO-DAY

The Eagle No. 3



THE PRACTICABILITY AND MECHANISM of which have never been equalled. Interlocking valves with safety pilot, one of the most important and unique features ever seen in an Instantaneous Heater.

A Gear Cut Water Valve Wheel facilitates a a quick and positive water supply regulation.

Greatest efficiency by far over any other Heater wherein the products of combustion do not come in direct contact with the water.

Heats the most water with the smallest consumption of gas.

The Most Artistic Heater in the World

Material and Workmanship of the Highest Standard.

A Construction that makes all parts Interchangeable.

Produced by a new company composed of the oldest and most experienced talent in the Instantaneous Water Heater line.

THE S. BERNSTEIN COMPANY

82-86 W. Broadway, NEW YORK

Our New Heater

The Acme No. 15

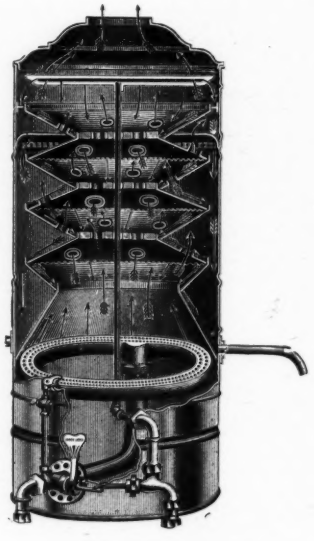
Will please your trade. It heats more water with a smaller Gas Consumption than any other Heater on the market.

It is 28 inches high and 12 inches in diameter

List price, nickel plated,

$20

IT HAS A LARGER HEATING SURFACE CONSIDERING ITS SIZE, THAN ANY OTHER HEATER ON THE MARKET.



There are other new features that will interest you. For information about them and discounts, address

THE MAKERS OF THE

Douglas, Acme and Flush Heaters

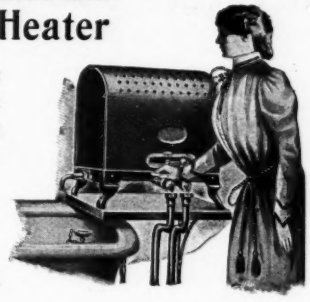
The Instantaneous Water Heating Co.

OHIO AND ORLEANS STREETS

CHICAGO

The Victor Instantaneous Water Heater

is the cheapest, the most efficient and the neatest water heater made. It occupies but little space and is always ready, furnishing hot water in a few seconds, day or night.



The Victor received the highest award at the Omaha Exposition in 1898.
Write for descriptive circular, prices, discounts, etc.

W. J. ADAM....JOLIET, ILL.

Special Inducement.

Tinners' and Plumbers' **Estimate Book**

DELIVERED

TO ANY ADDRESS IN THE UNITED STATES
UPON RECEIPT OF $1.25.

THE BEST BOOK EVER PUBLISHED.

Yours respectfully, **C. S. MERSICK & CO.**
NEW HAVEN, CONN.

"TOTAL ECLIPSE HYDRANTS AND STREET WASHERS"

The cheapest and most durable on the market. Guaranteed to give entire satisfaction. . . . .

WE ALSO MAKE ALL STYLES OF "Mc'NAMARA" ..PATTERN HYDRANTS..

Carried in stock by all Jobbers.

Write your dealer for prices.

JOHN C. KUPFERLE.
ST. LOUIS.

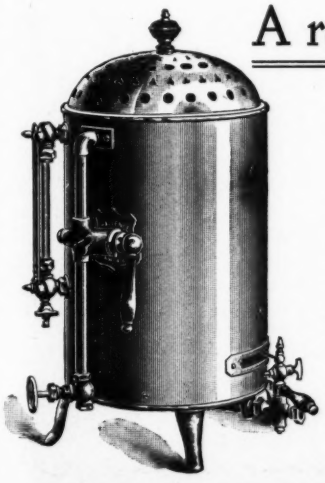
SEND FOR FREE BOOKLET.
THE TYDEN is the best filter
METROPOLITAN FILTER CO. 97 Washington St. CHICAGO.

This Investment is Good!

An adv. in this journal is read by all the trade. Write us for terms.

Domestic Engineering, Chicago

A record breaker



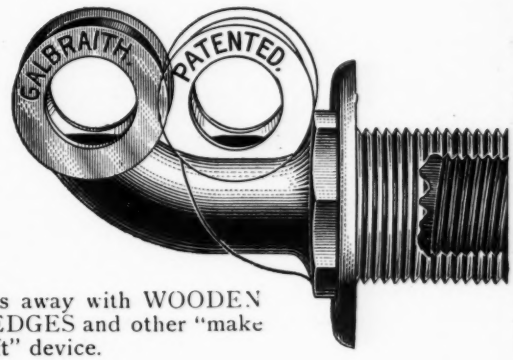
Boils water in 1½ minutes

This heater with gas attachments for heating water to a high temperature with unequal rapidity and economy cannot be surpassed by any heater on the market. Adapted for bath rooms etc. Send for catalog.

Challenge Mfg. Co.
South Norwalk, Conn.

WHY! EH! WHY!

BECAUSE



IT does away with WOODEN WEDGES and other "make shift" device.

IS NON-TRAPABLE,

IS especially adapted for wash trays having openings for faucets very close to top of tub.

IT prevents sediment collecting in wash tray supplies.

YES we make them in brass and galvanized iron.

IT it is used by economical plumbers everywhere.

IS kept in stock by leading supply houses.

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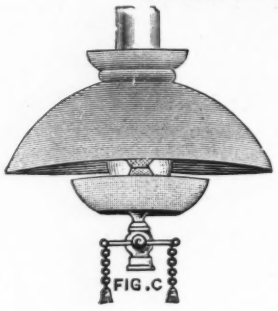

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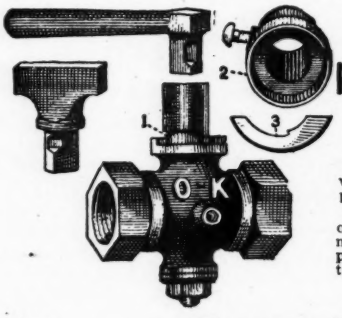

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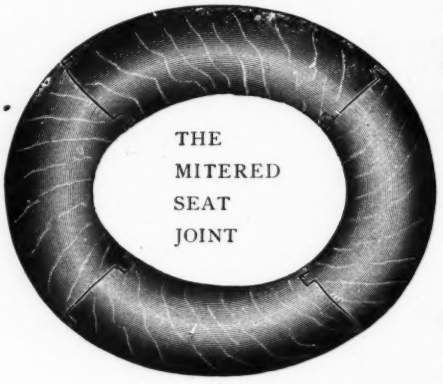

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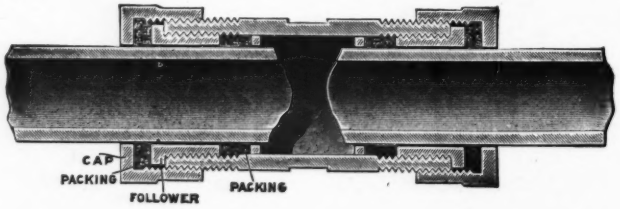

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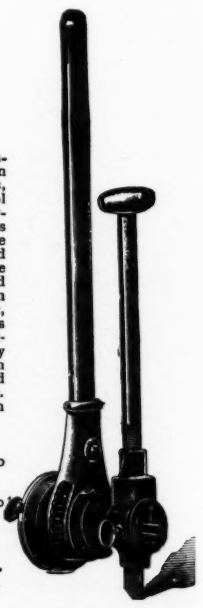

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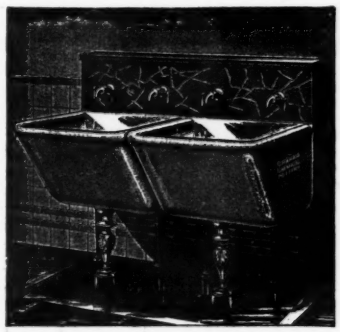

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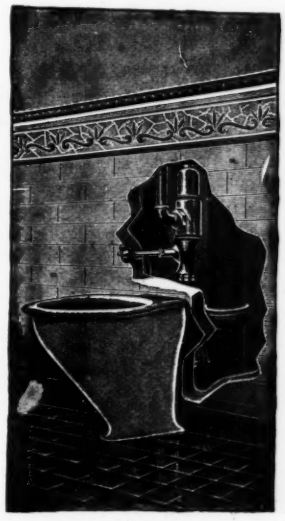

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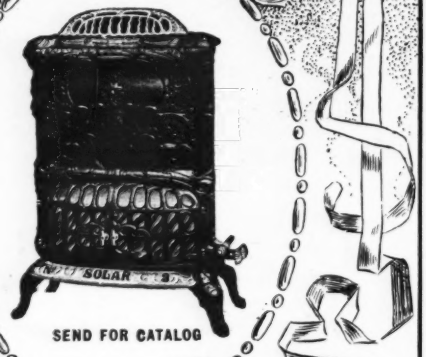

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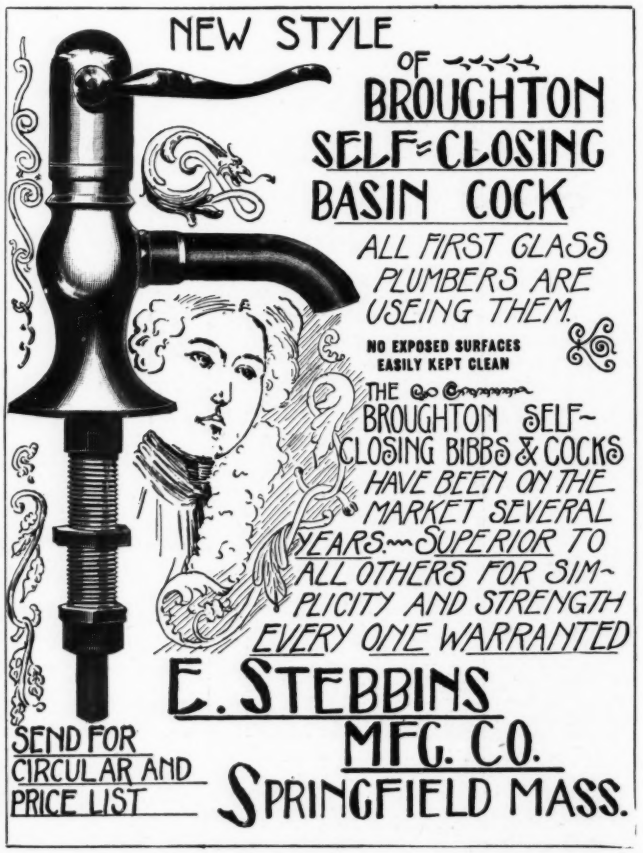

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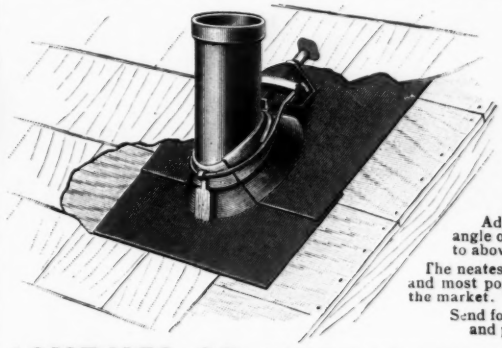

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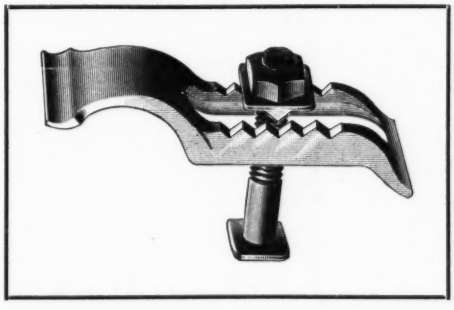

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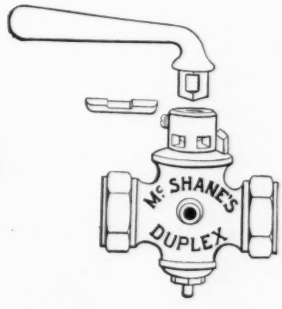

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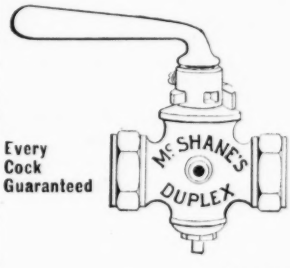

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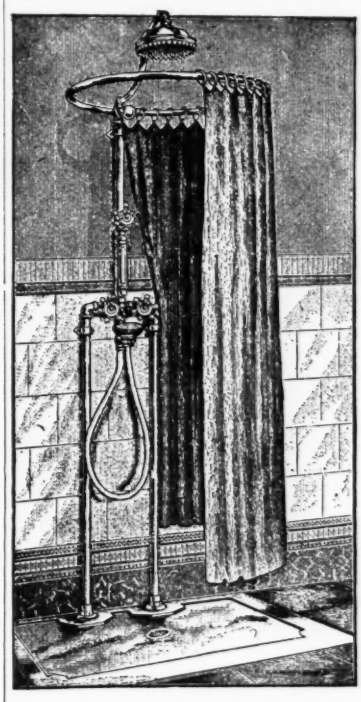

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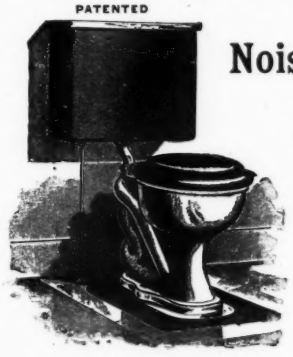

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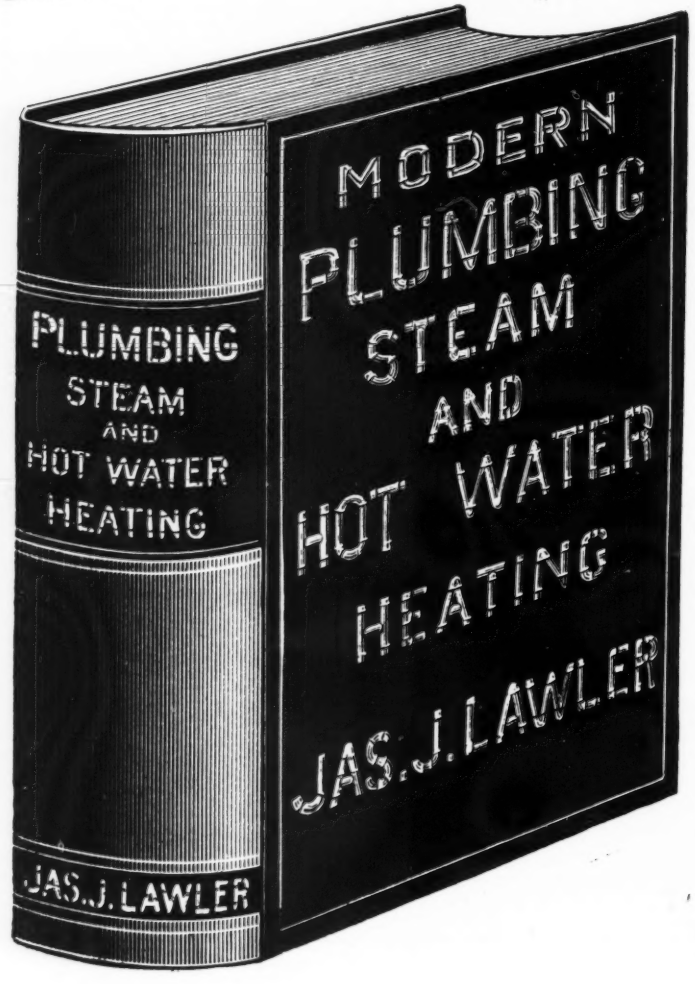

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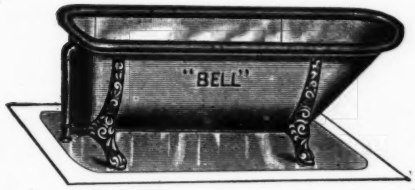

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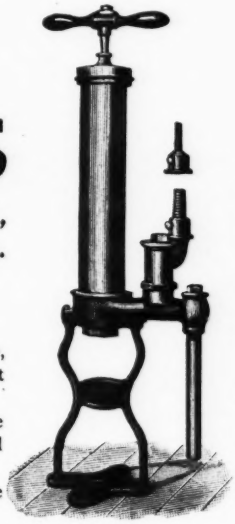

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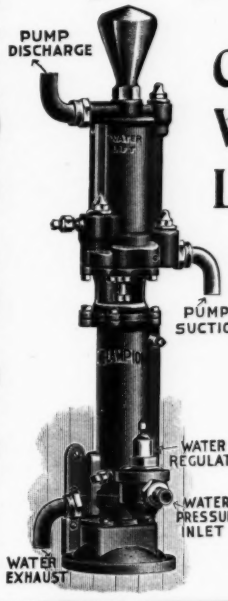

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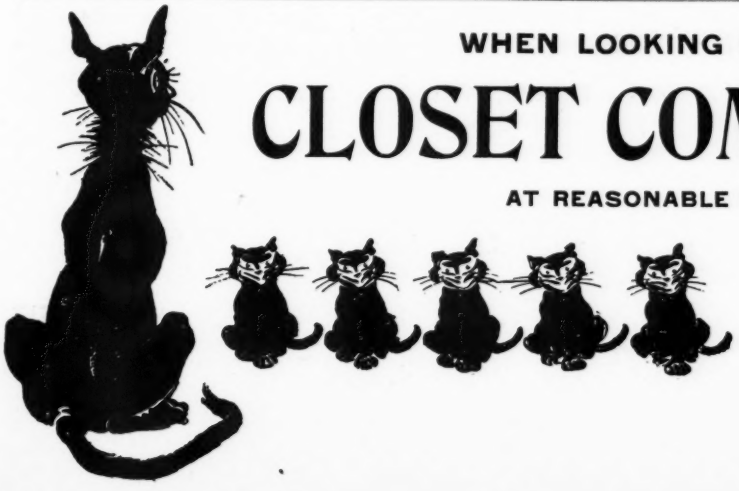

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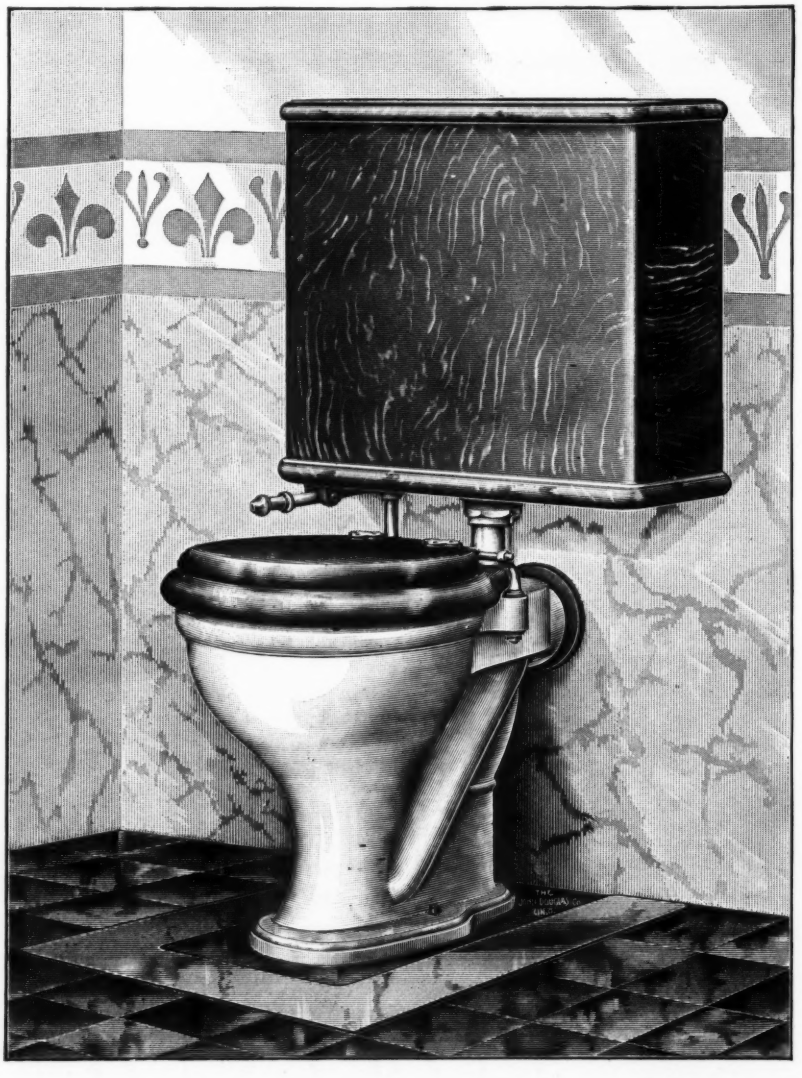

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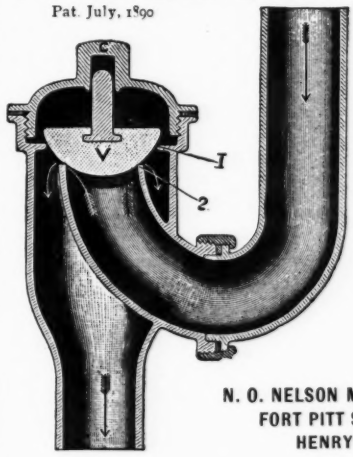

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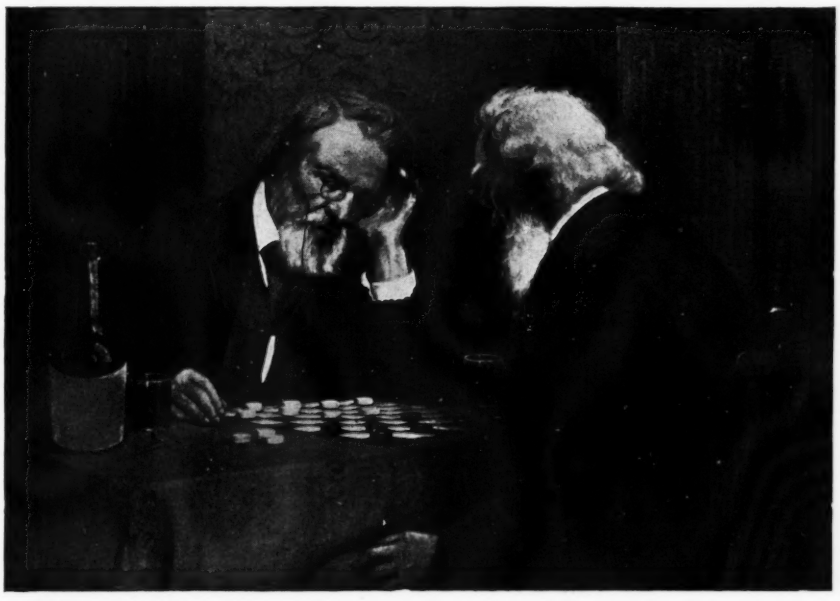
Lead pipe, sheet lead
Ebony gloss plumbers' soil



THE AMERICAN PROCESS ENGRAVING CO.

15-27 West Sixth Street
CINCINNATI, O.

Makers of Fine CATALOGUE ILLUSTRATIONS

NO. 5

"Gegenstrom" Apparatus

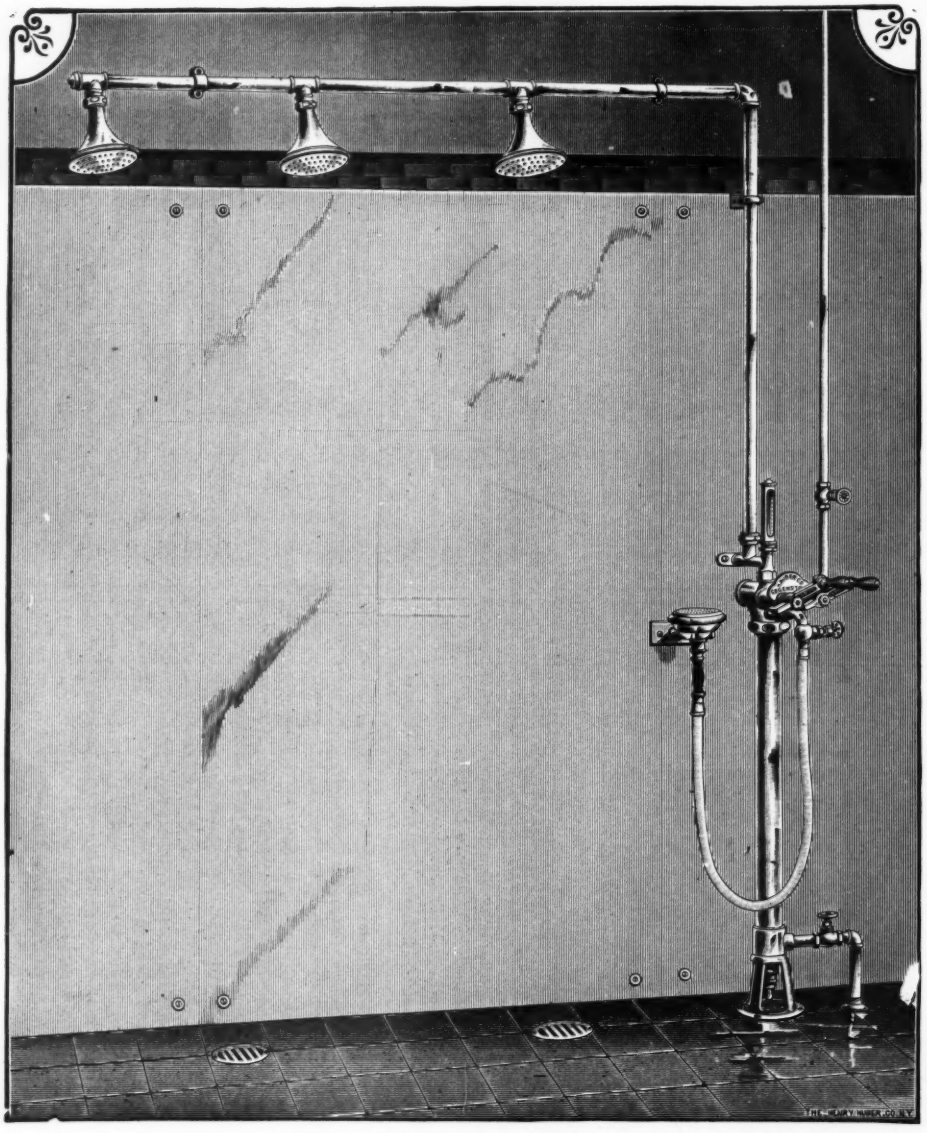


Plate 467—c.

An apparatus for supplying warm or hot water by means of steam

For use in asylums gymnasiums prisons hospitals club houses public institutions etc., etc.

The No. 5 "Gegenstrom" is suitable wherever it is desired to bathe three or four persons together. The three overhead douches play at the same time and must not be controlled by shut-off valves. The hand-spray placed under water and steam valve handles, can be operated independently. The room may be partitioned into three or four separate stalls where privacy is prefered.

The apparatus furnishes water at temperature not exceeding 110 degrees Fahr., and all danger of scalding is averted. A bath attendant operates the apparatus and fixes the length of time the douches are to run. When desired, he can gradually lower the temperature of the warm water by slowly closing off the handle or steam valve.

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Rundle-Spence Manufacturing Co.

Manufacturers of Plumbers' and Steam Fitters' Supplies.

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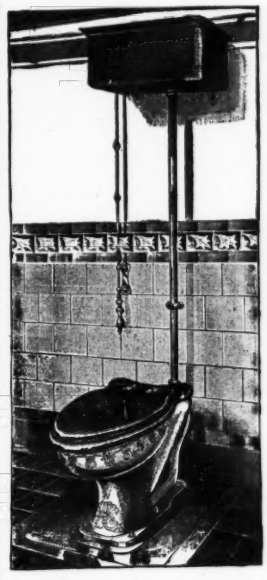


—THE—

ORINOCO

Syphon Jet Closet.

This Orinoco Syphon Jet Closet is what you should have. This is the most perfect and noiseless closet now manufactured. The workmanship and High Grade Finish of the Orinoco Closet cannot be excelled.

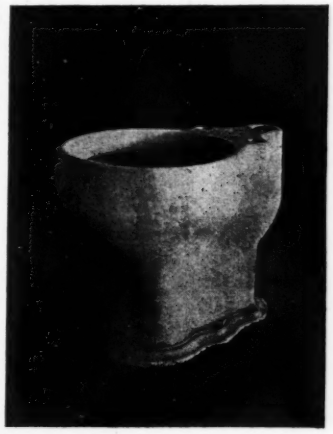
IT SPEAKS FOR ITSELF
TRY ONE AND BE CONVINCED.

MANUFACTURED BY

THE KING MFG. CO.

LIMITED.

205 Wood Street, Pittsburgh, Pa.



NEW SYPHON JET WATER CLOSET.

Patented June 20, 1899.

This closet differs from any other Its concealed jet pipe permits a perfectly symmetrical bowl which will not catch dust or dirt. Its design is unique and its perfect working qualities commend it very highly to jobbers and the trade. Absolutely vitreous, warranted not to craze. Made to connect with overhead tank.

We make sanitary specialties for inventors and jobbers, correspondence solicited.

THE SANITARY EARTHENWARE SPECIALTY COMPANY,
Trenton, N. J.

See that Clamp.

THE "CLIMAX" Rubber Adjustable Elbow.

SIMPLICITY AND PERFECTION.

DAVIS' INVENTION. PATENTED OCT. 27, 1897.

"Climax" Trade Mark Registered. Beware of Infringement.

When Rubbers become worn out, they can be readily replaced by new ones. The only elbow by which this can be accomplished. Admits of greater variety of adjustment than any other. *See that our name is on all elbows.* The only Rubber Elbow having full 1¼ in. opening for flush. The largest manufacturers of Plumbers' Specialties in the world.

The Climax Specialty Co.,

Send for Catalog No. 2. SENECA FALLS, N. Y.

THE VERY BEST BALL COCK

For High Pressure.

Has reversible seat made of Bronze Metal.

For sale by dealers in supplies. Correspondence Solicited.

Patented.

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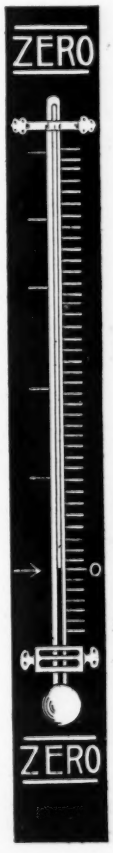

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Zero Jr. Hydrant,
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Large Wastes, Quick Action, Non-Freezing. Cheapest and best Hydrants in the world.

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BUFFALO, N. Y.

IMPORTANT NOTICE

TO MY FRIENDS IN THE PLUMBING AND HEATING TRADE:

Be it known that I, Alan H. Tripp, inventor of Gumbo Cement and Vice-president of the Gumbo Cement Company, of Chicago, Ill., U. S. A., have this 14th day of July, 1900, severed all connection with the said Gumbo Cement Company and have no interest financial or otherwise with said company. I am in business for myself and have been promised support by all my many friends.

KEEP UP WITH THE TIMES—I have invented a Pipe Cement guaranteed to be superior to any Pipe Cement on the market.

10 lb. Pail	TRIPP'S	O. K.	PIPE	CEMENT,	$1.00
25 lb. "	"	O. K.	"	"	2.50
50 lb. "	"	O. K.	"	"	4.75
100 lb. "	"	O. K.	"	"	9.00

Freight prepaid on orders of 100 lbs. to any railroad depot in U. S.A. if cash accompanies the order.

I am also manufacturing a Plumbers' Putty (made by request) this Putty will not rot out and sets harder and quicker than ordinary Putty; it is especially adapted for connecting and setting slate urinal stalls or connecting brass and metal to earthenware. Put up in pails holding about 15 to 18 lbs., at 75c.

Respectfully yours,

ALAN H. TRIPP

2829 Calumet Ave., CHICAGO, ILL.

Manufacturer of Tripp's O. K. Pipe Cement
and Tripp's O. K. Plumbers' Putty.

S. P. STAMBACH. ROBERT LOVE.

STAMBACH & LOVE

Plumbers' Supplies

And Sanitary Specialties

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PHILADELPHIA.

WIRE STRUNG TAGS A SPECIALTY

STRONG TAGS For SUBSTANTIAL BUSINESS.

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THE AMERICAN MFG COMPANY. BATTLE CREEK, MICH. MANUFACTURERS OF SHIPPING TAGS.

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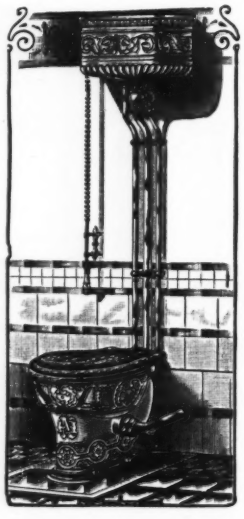
PLUMBERS' SUPPLIES

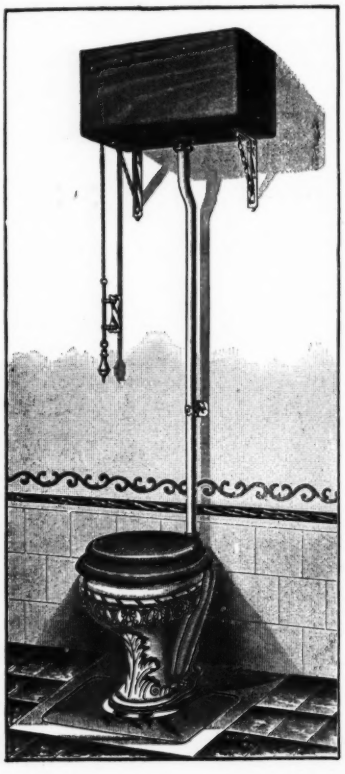


Nelson Syphonia Water Closet

Pneumatic syphon

PRICE REDUCED
QUALITY RAISED

N. O. NELSON MFG. CO., SAINT LOUIS



The "Diamond" Siphon Jet Water Closet

WITH ROLL RIM

A Beautiful, Clean and Durable Sanitary Fixture

McClellan Anti-Siphon Trap Vent

Lead Pipe, Lead Traps and all kinds of Plumbers' Materials

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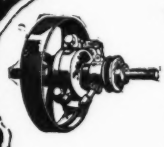

A Book for the Trade

American Steam Heating Practice.

From THE ENGINEERING RECORD
(Prior to 1887, The Sanitary Engineer).

This book is a supplement to Steam Heating Problems, published in 1888. It contains elaborately illustrated descriptions of the heating and ventilating plants of notable recent Residences and Apartment Houses, Churches, Schools, Theatres and Amusement Halls, Public Buildings, Hospitals, Railway Shops, Hotels, Office Buildings; besides a great variety of notes, questions and answers on the subjects of Boiler Proportions, Cost of Steam Heating, Methods of Heating, One-Pipe Systems, Exhaust Steam Heating, Systems of Piping, Expansion of Piping, Air Valves, Greenhouse Heating, Fuel Consumption, Heating Below the Water Level, Expansion Tanks, Heating Surface, Unwise Heating Contracts, and Notes on Ventilation.

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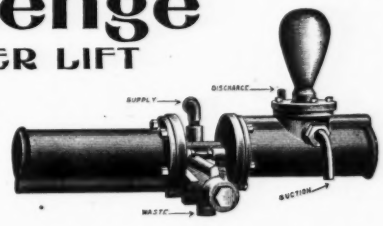
The Challenge
AUTOMATIC WATER LIFT

FOR TANK OR DIRECT PRESSURE.

Balanced valve. Always works.
Cannot stick. Fully guaranteed.
M hydrants, plumbers' brass work.
Write for prices and catalogue.



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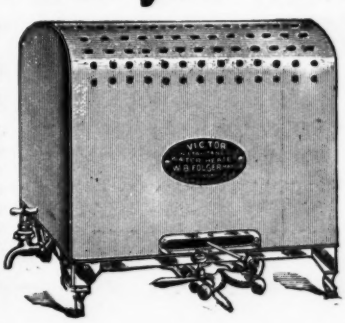
LA FAYETTE, IND.

Here is what you want, at last

The Victor
INSTANTANEOUS WATER HEATER

This heater has been tested thoroughly for two years under all possible circumstances and conditions, and every fault eliminated. It is **simple in construction, perfectly safe to manage, not liable to get out of order, easily repaired, occupies a very small space.**

INSTANTANEOUS IN ACTION.



Uses illuminating gas, hence there is no odor, and **no flue** required, as with atmospheric burner heaters.

Will warm the room while heating water for a bath.

Is either right or left hand as desired, and both ends can be used at once if needed.

Automatic in action, one lever turning on both gas and water, and burning out is impossible. Cheap, in price.

Address

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MANUFACTURER
320 WEST FOURTH STREET
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IN ANY WOOD

HERMANN FURNITURE AND PLUMBERS' CABINET WORKS

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Up to Date Finish

TRY OUR GOLDEN OAK FINISH

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We make Pitcher Spout and House Force Pumps with enameled Cylinders, Enameled Sinks, Stop Boxes, Sill Cocks, N. P. Traps and Plumbing Brass Goods . . . Write for prices.

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BURRELL & FOWLER · CLEV'D O

REDFIELD'S Wrought Steel **Hose Clamps**

Strong, Light and Pliable, Perfect Inner Circle Will not leak

MANUFACTURED BY

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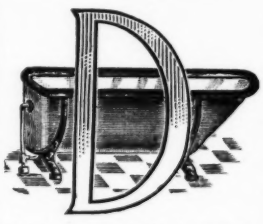
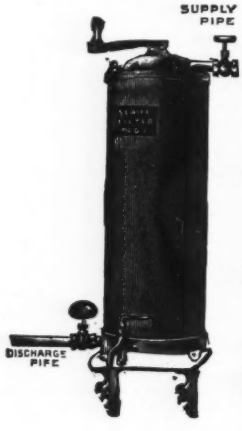


DAY Sanitary **BATH TUBS...**

We originated STEEL, ENAMEL AND STEEL CLAD BATHS, and claim superiority over all others. Our new list is out, shall we send you one?

DAY METALLIC MFG. CO., Detroit, Mich.

People who read this edition of DOMESTIC ENGINEERING buy one hundred per cent of all heating and plumbing supplies sold in the United States.



Eminent chemists testify that our Water Filters are germ proof. No chemicals used; Filters can be thoroughly cleansed without removing any part..... ....Results guaranteed....

CAPACITY 10 to 10,000 gals. per hr.

Hundreds of our customers have furnished voluntary testimonials.

LIBERAL DISCOUNTS TO PLUMBERS.

Catalogue Mailed on Application.

WM. B. SCAIFE & SONS, PITTSBURGA, PA.

The GENESEE No. 10

Frost Proof Automatic Water Closet

For outside locations where other closets will freeze. Perfectly frost proof in zero weather. Tank and pipes always empty except when closet is in actual use. Cannot be used without discharging itself; no water left above frost line.

Ask for catalogue of other goods.

Genesee Automatic Closet Co.
ROCHESTER, N. Y.

THE DEAD ADVERTISE NOT

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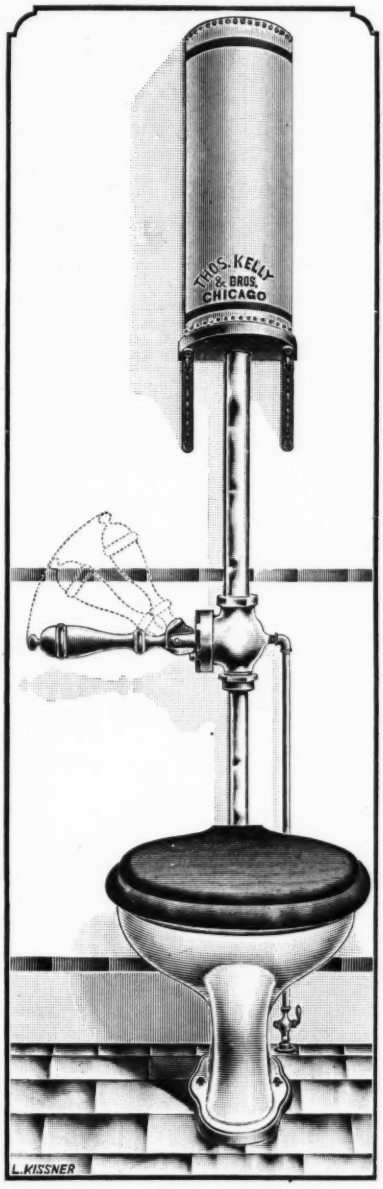

FIG. 150.
Pat. Sept. 5, 1899 and July 10, 1900.

An Air Chamber
A Periodical Flush
A Handle Lift
A Chain Pull

COMBINED IN ONE

Willsell Apparatus to fit your own closets.

No matter how small the feed pipe is you get the benefit of a 1¼ in. pipe to deliver the water to the closet at the same pressure as at your water works.

It makes an auxiliary water works at home.

It gives the same flush if fed by a ⅛ inch pipe, as if you had an independent 1¼ inch pipe run from the main to each water closet.

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ABSOLUTE VALVE—The valve is constructed so that it would burst before leakage. It cannot hum, pound or rattle at any pressure.

Also manufacture the Kelly Self-Closing Cock, Kelly Hopper Cock, Kelly Water Cushion, Kelly Sanitary Wash Basin and the Kelly Shower Bath Ring.

Thos. Kelly & Bros.

76 to 82 Jackson Boulevard,
Corne. Clinton St., CHICAGO.

A. G. Oliphant, President. P. H. Moohan, Vice-President.
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The Bellmark Pottery Co.

TRENTON, N. J.

MANUFACTURERS OF

Sanitary Specialties

Wish to call the attention of the trade to their new improved Siphon Jet Water Closet for low down tank, which, aside from its silent and perfect operation, overcomes the chief objection to that style water closet, (the roughing-in measurements.)

It roughs in at 11½ inches, and while strictly up to date for new work, can also be used to replace the regular Siphon Jet, No. 2 and No. 3 Washouts, Combined Hoppers and Traps, Siphon Washdowns, or in fact, any of the regular closets on the market.

It is made with the standard 5½ inch seat attachment, and can be furnished in Plain or Embossed, and made of Vitreous China, White or Ivory.

WE MANUFACTURE EVERYTHING IN THE SANITARY EARTHENWARE LINE AND CORRESPONDENCE REGARDING SAME IS SOLICITED

The Crawford Lavatory

The only Basin in which the water, during use, does not come in contact with any metal whatever. Other makes of basins require either a concealed metal standing overflow, which allows the sediment from water in use to collect on its exterior surface, as well as on the walls of overflow chamber whenever used, or the older method of plug and chain, which is practically obsolete. The upper portion of overflow chamber forms a soap dish, having a removable porcelain drainer, an entirely new feature, and one which will be thoroughly appreciated. The overflow chamber is large and fully exposed to view, and when drainer is removed, perfectly accessible for cleansing. All Crawford Basins are made of "Vitreous" ware, which is non-absorbent, and will not craze. Prices on application.

JOSEPH H. YOUNG,

226 FRANKLIN STREET. BOSTON, MASS.

The

"Sedate"

We Handle all grades of Low Down Tank outfits, including syphon jet, syphoning hoppers with jets and plain hopper and trap combinations.

We Manufacture the "QUIET" syphon jet and the "SEDATE" syphoning hopper outfits and recommend them to all who desire a thoroughly high grade and highly perfected outfit.

The TANKS, seats and lids are made from carefully selected hard woods, which are highly finished. The "Quiet" and "Sedate" tanks have heavy tinned copper linings and all seams are locked and carefully soldered.

Haines, Jones & Cadbury Company

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BILLINGS PIPE BENDERS

Patented Sept. 24th, 1889.

SAVES TEN TIMES ITS COST EVERY MONTH.

This device is a **Specially Shaped Spiral Spring,** made from **Crucible Steel** wound tapering to one end so as to be easily withdrawn, and having a loop at the other to hook into when the bend is to be made in a long piece of pipe.

The Bender, placed inside of the pipe, supports and prevents the pipe from flattening or collapsing while being bent. By the use of it lead pipe, and copper, brass or steel seamless tubing may be quickly and easily bent. It is as easy to form opposite or double curves, such as goose necks, as a single bend.

THE BILLINGS PIPE BENDER MFG. CO.

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MADE BY

The SCHNEIDER-TRENKAMP Co., Cleveland, Ohio.

Points which are of interest to plumbers

WE GIVE YOU WHAT YOU WANT WHEN YOU WANT IT AND AT THE RIGHT PRICE

YOU ARE THINKING
of what you may need at this season of the year.

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Plumbers' Torches, Thawing Steamers, Closet Repair Connections, Plumbers' Furnaces, Steam hose, etc., etc.

MAY WE SUPPLY YOUR WANTS?

WE HANDLE EVERYTHING IN PLUMBING, GAS, STEAM AND WATER SUPPLIES

Have you our Catalogue, Memorandum Book and Calendar?

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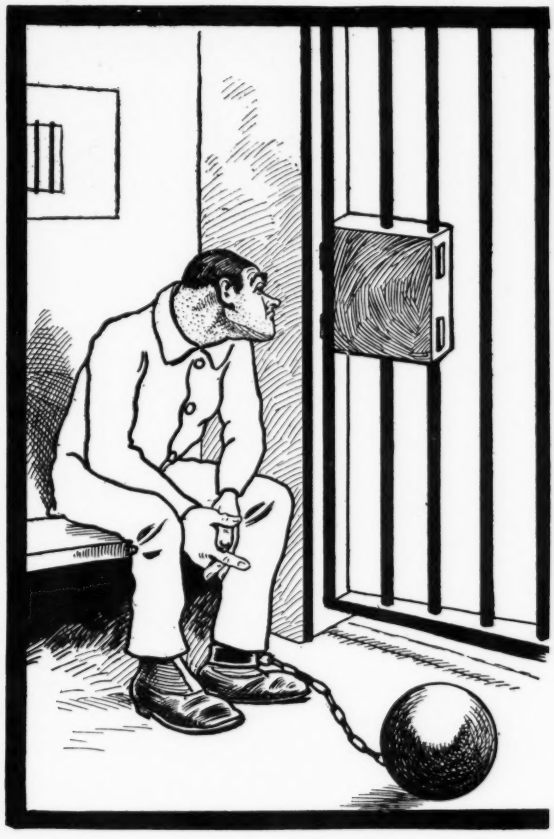
The No. 1 Fire Pot has no Weak Points

The top section is made of heavy smooth iron with malleable iron fittings. The top ring has heavy lugs recessed for holding cover in position, leaving air space all around, evenly distributing the heat. These lugs support metal pot when in use, bringing the flame on all sides. **A pair of coppers and a pot of metal** can be heated at the same time. In heating coppers the flame strikes the largest part and runs to the point, the heavy part being in the hottest part of the flame heats quickly without burning off the tinning. The No. 1 has no weak points. Jobbers sell them everywhere.

$6.00, NET

CLAYTON & LAMBERT MFG. CO., Detroit, Mich.

A STRONG CONVICTION



ALL BRASS LEVER HANDLE

We have a strong conviction that the plumber who does not make all the money he thinks he ought blames the wrong man.

He either blames the customer, or else he blames himself.

He never thinks of blaming the dealer who sold him his supplies, and yet the supplies you use in your plumbing work are as important as the work itself.

Your work is your own, and you know that it is good.

Do you know that your cocks, fuller and compression-work and other supplies are equally good?

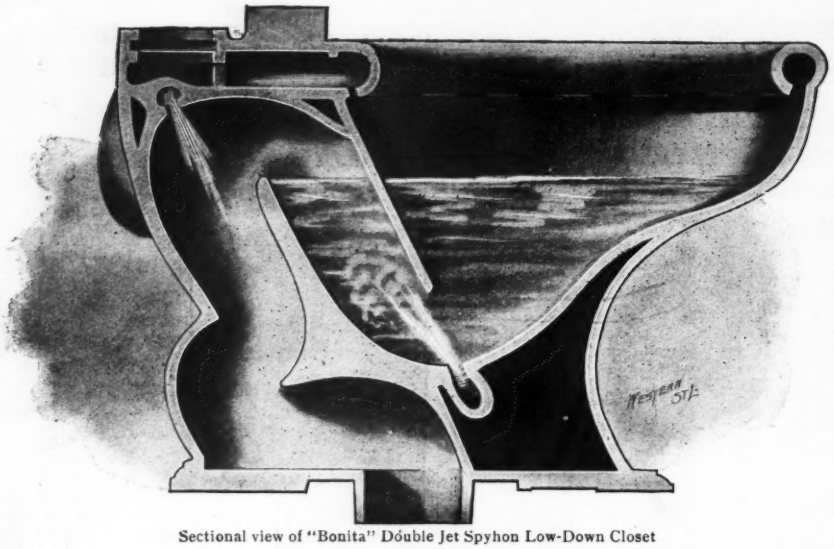
Your customers judge your work by what you do and by what you use.

The best costs no more than the next best, and the best in that case is Glauber's.

Why do you not try it?

The best is none too good for you.

GLAUBER BRASS MANUFACTURING CO., CLEVELAND, OHIO



Sectional view of "Bonita" Double Jet Spyhon Low-Down Closet

Rumsey's "Bonita"

Double Jet Low-Down Syphon Closet

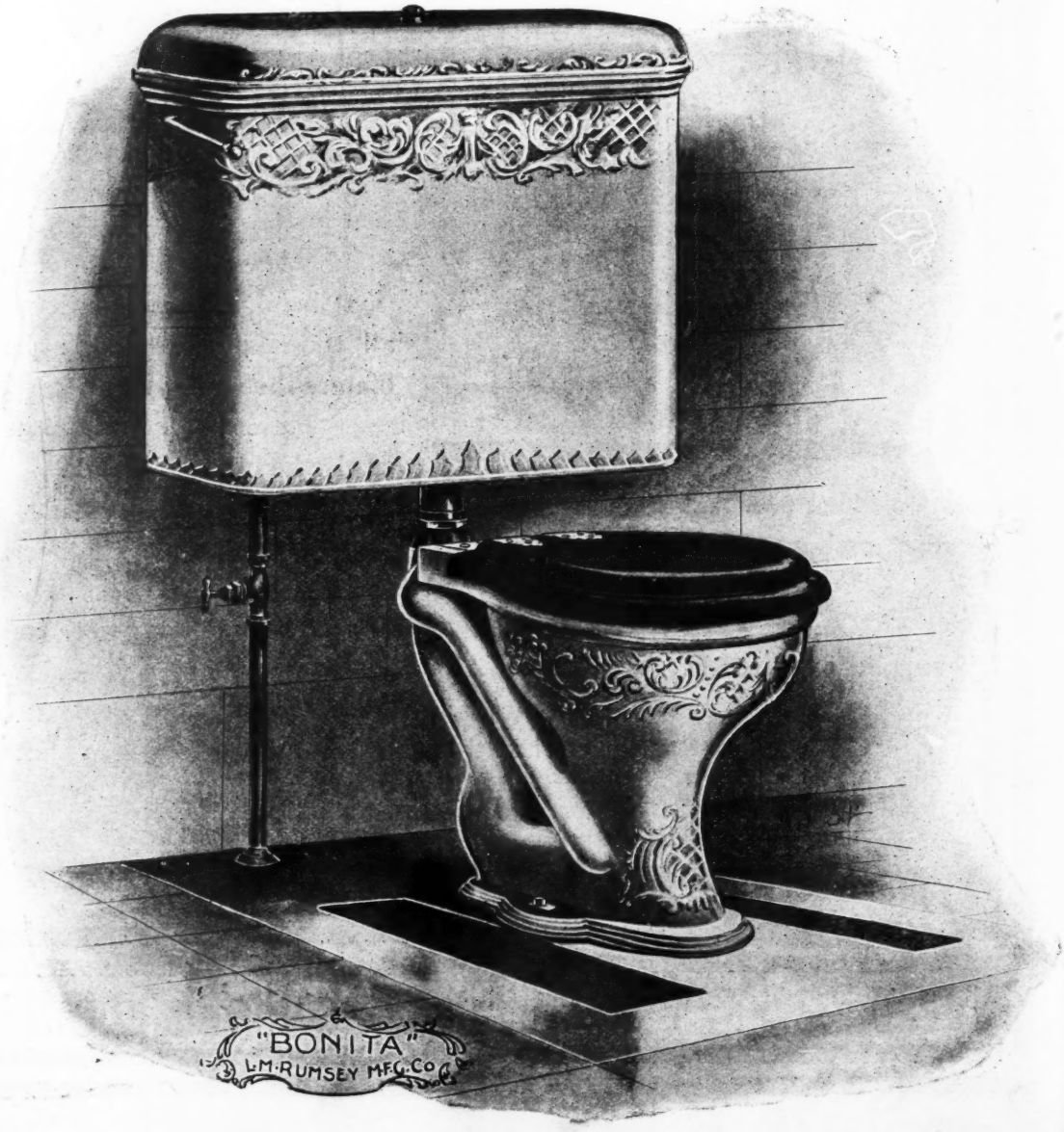
The cut at the top of this page shows a sectional view of our "Bonita" closet, as designed and patented, for low-down use. The objections heretofore in low-down closets have been the inefficiency of the syphoning, because of the lack of pressure, caused by placing the tank so near the closet. The difficulty is overcome in our new closet by adding a downward jet into the discharge leg of the closet, thus driving the air out of the discharge leg of the closet and removing the resistance to the upward jet. The downward jet is effectively trapped to prevent gases passing through same and through the flushing rim into the room.

We recommend this closet to architects and plumbers as a perfect working and sanitary closet.

L. M. Rumsey Mfg. Co.

810 North Second St. ST. LOUIS, MO.

Rumsey's "Bonita" Double Jet Syphon Low-Down Closet with Porcelain Tank



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THE JAMES ROBERTSON MANUFACTURING CO.
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LEAD TRAPS	ENAMELED BATH TUBS
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LEAD PIPE	FINE BRASS WORK
SHEET LEAD	SANITARY WATER CLOSETS
BLOCK TIN PIPE	TANKS, SEATS, ETC.
LEAD AND IRON FERRULES	

SALES RECORD shows that our "Users' List" of Peerless and Duplex Pipe Threading and Cutting Machines is constantly increasing through the addition of new customer's names. It does not stop there by any means! Duplicate orders, or those for larger machines, from customers already of record are a very noticeable feature of our sales. The catalogue we isssue is interesting and will be gladly mailed without charge.

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DeFRIES & CO. ACTIENGESELLSCHAFT. DUSSELDORF.
AKTIEBOLAGET VERKTYGSMASKINER, STOCKHOLM.

BIGNALL & KEELER MFG. CO.

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ADVERTISING CUTS
FOR PLUMBERS, STEAM AND GASFITTERS.
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DOMESTIC ENGINEERING
58-64 N. Jefferson St., CHICAGO.

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Flanged Pipe and Fittings
Hydrants, Gates
Pig Lead, Jute, Etc.

CAST IRON PIPE
And Specials for Water and Gas.
Wholesale Eastern Agents
AKRON VITRIFIED SEWER PIPE

Manufacturers of Lead Pipe Solder, etc., and Jobbers of Plumbers and Tinners' Goods

"THE CAST SINK MUST GO"

"Columbus" and "New Era"
WROUGHT STEEL SINKS.
ROLLED RIM AND FLAT EDGES.

PAINTED
GALVANIZED
BLUE ENAMELED
GREY ENAMELED
WHITE ENAMELED

Write for Catalogue and Prices.

The Kilbourne & Jacobs Mfg. Co., COLUMBUS, OHIO.

L. WOLFF MANUFACTURING CO.

CHICAGO, ILL.

WOLFF'S MONARCH PORCELAIN DOUBLE LAVATORY

Above is one of the many new designs of Lavatories illustrated in our Catalogue F, 1900, now being distributed to the plumbing trade. If you have not received one kindly advise us and we will forward a copy to you at once.

L. WOLFF MANUFACTURING CO.

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